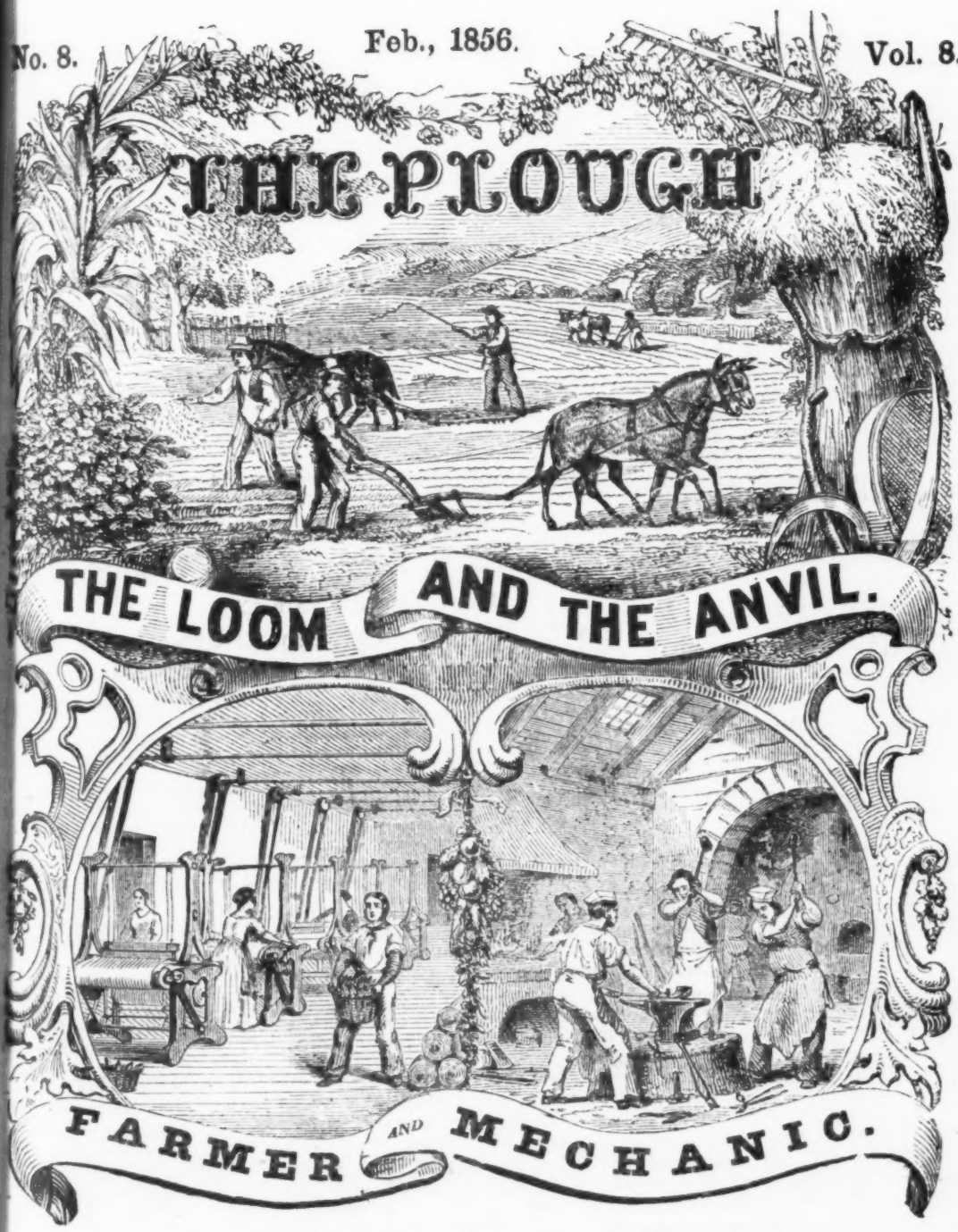
No. 8. Feb., 1856. Vol. 8.



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"This is to certify that I have been using Hurd's Hair Restorer about three months, and now, where my head was bald, it is covered with a new growth of hair." Capt. GEO. G. BENJAMINS.

POQUETANNOCK, Conn., Feb. 14, 1855.

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The Plough, the Loom, and the Anvil.

Vol. VIII. FEBRUARY, 1856. No. 8.

AGRICULTURAL PRODUCTS AND PRICES.

The cause of the present high prices has been a subject of discussion in many quarters and by various interests. As many different conclusions have been drawn as the various prejudices or sympathies or whims of the writer would suggest. We do not purpose to assume the position of a disputant with any of these, except so far as the elucidation of the truth on this subject may place us in that position. We shall chiefly confine ourself to facts that cannot be well controverted. If the statements are not reliable, and can be shown to be incorrect, we shall be happy to furnish facilities for making known the mistake as extensively as possible.

We rely chiefly on the returns of the census. Our opinion of the correctness of these, so far as they are made up of thousands of details, often "contradictory and irreconcilable," our readers well know. So far as large and comparatively permanent operations are involved, we should not hesitate to abide by their authority. The returns with which we are here interested are partly of each of these classes.

Certain statements in relation to the production of grain crops in some of the States we cannot doubt are erroneous. For example: By the census of 1840, Kentucky produced more than 4,800,000 bushels of wheat, while by that of 1850 she grew only 2,142,000. Could there have been so much difference in the growth of wheat in these years? By the census of 1840 Ohio raised 16½ millions, and by that of 1850 only 14½ millions of bushels. Maine, by the former, grew 848,666 bushels, and by that of 1850 only 296,259 bushels of wheat. In some other States we find differences that cannot be regarded as probable. They may, however, be essentially correct, and the presumption no doubt is that, on the whole, the errors nearly balance each other, so as to give a sum total that is comparatively reliable.

We only add a single suggestion, before we exhibit our tables of the production of the chief articles of food. The community that does not produce more than it consumes is not prosperous. It must deteriorate. We have recently presented statements of the products of several States, per acre, and the inference is inevitable, from the facts elicited, that some sections of the country are actually and essentially impoverished by such cultivation. We now purpose to give a more extensive view in regard to the edible products of this country. Such statements will furnish a basis for important conclusions in reference to very grave discussions which are often presented to the public in periodicals and in speeches.

It is often said that present high prices are the result of an actual deficiency in the production of food. "The crops are not grown," and of course cannot be furnished. We shall see how much propriety there is in this supposition. With this intent, we first present a comparative view of the number of bushels of the chief crops of the kind described raised in the United States, as given in the returns of the census of 1840 and of 1850, and also of the amount of some others of the principal crops of the country:

	1840.	1850.
Corn,	377,531,875	592,071,104
Wheat,	84,823,272	100,485,944
Rye,	18,645,567	14,188,813
Buckwheat,	7,291,743	8,956,912
Barley,	4,161,504	5,167,015
Oats,	123,071,341	146,584,179
Total, bushels,	615,525,302	867,453,967
Potatoes,	108,298,060	104,066,044
Hay, tons,	10,248,108	13,838,642
Total No. of neat Cattle,	14,971,586	18,378,907
" " Sheep,	19,311,374	21,723,220
Bales of Cotton,	1,976,198	2,445,793

In estimating the relative sufficiency of these crops, as returned in 1840 and 1850, it must be borne in mind that during this period the population increased in the ratio of 35.87 per cent.

A comparison of these columns shows that there is an immense increase in the amount of Indian corn, being an excess of about 57 per cent., and a decrease in the quantity of rye and of potatoes. Of the general accuracy of these returns we have no doubt. But now we must descend to a few particulars, and learn other results that may have an important bearing in all these discussions.

We add also a statement of the production of the same crop in the different territorial divisions of the United States:

	Indian Corn or Maize. 1840.	1850.	Increase of population from 1840 to 1850.
New-England,	6,992,909	10,175,856	22.07
Middle States,	39,946,213	60,413,948	29.44
Southern "	94,998,255	117,572,608	18.58
S. Western "	89,893,973	122,637,135	47.89
Western, "	145,700,525	280,864,368	54.43
	377,531,875	591,663,915	

The tables which follow show the different quantities of grains raised in the six States most productive of the several kinds, by the census of 1840 and of 1850, the amount of the crop of 1840 to each person, and the increase of population in each State during that time. These tables will show how the production compares with the increased numbers to be fed.

The amount allowed by Tucker and others for the support of our population, including that required for seed and for domestic animals, is as follows: 85 bushels of corn, 28 bushels of wheat, and 25 bushels of other grains, to a family of five persons. These furnish the means for judging of the deficiency or surplus in any given State:

CORN.

	1840.	1850.	Amount of crop of 1840 to each person.	Increase of population.
Illinois,	22,634,211	57,646,984	47½	78.81
Kentucky,	39,047,120	58,672,591	50	25.98
Missouri,	17,332,524	36,214,537	4½	77.75
Indiana,	28,155,887	52,964,363	41	44.11
Tennessee,	44,986,188	52,276,223	54	20.92
Ohio,	33,668,144	59,078,695	22	30.33
	185,824,074	316,853,393		

WHEAT.

Ohio,	16,571,661	14,487,351	11	30.33
Pennsylvania,	13,213,077	15,367,691	7½	34.09
Indiana,	4,049,375	6,214,458	6	44.11
New-York,	12,286,418	13,121,498	5	27.52
Illinois,	3,335,393	9,414,595	7	78.81
Virginia,	10,109,716	11,212,616	8	14.67
	59,565,640	69,818,189		

OATS.

	1840.	1850.	Increase of population.
New-York,	20,675,847	26,552,814	27.52
Pennsylvania,	20,641,819	21,538,156	34.09
Ohio,	14,393,103	13,472,742	30.33
Virginia,	13,451,062	10,179,144	14.67
Illinois,	4,988,008	10,087,241	78.81
Kentucky,	7,155,974	8,201,311	25.98
	81,305,813	90,031,408	

IRISH AND SWEET POTATOES.

New-York,	30,123,614	15,403,997	27.52
Georgia,	1,291,366	7,217,807	31.07
Pennsylvania,	9,535,663	6,032,904	34.09
Alabama,	1,708,356	5,721,205	30.62
N. Carolina,	2,609,239	5,716,027	15.35
Ohio,	5,805,021	5,245,760	30.33
Mississippi,	1,630,100	5,003,277	61.46
	52,703,359	50,336,977	

HAY (TONS.)

Vermont,	836,739	866,153	7.59
New-York,	3,127,647	3,728,797	27.52
Pennsylvania,	1,311,643	1,842,970	34.09
Maine,	691,358	755,889	16.22
Ohio,	1,022,037	1,443'142	30.33
Massachusetts,	569,395	651,847	34.81
	7,558,219	9,288,598	

Taking the usual estimate, already stated, for the supply of the entire population of the country, we find an excess of 196,109,229 bushels of corn and 16,700,674 bushels of other grains, and a deficiency of 12,393,356 bushels of potatoes. Hence it is obvious that much more than sufficient is grown for the food of the country. For this allowance appropriates not only the necessary amount of seed and a due proportion for domestic animals, but also one-sixteenth of the crop for exportation. Now what amount has

been exported, and what has been destroyed in the still? We are under no special obligation to inquire into these matters, so far as the question of short supply is concerned; for this is a matter of choice and not of necessity and were half the country dying of famine, distillers would buy and convert into these noxious beverages as much as they could with a decent profit, without regard to any other consideration. Some distillers and some exporters might be restrained by humane considerations, but we think this number in either class would be a very small proportion of the whole.

We have already shown that food enough is raised to supply all the people. The crops of the present year are much larger than in 1850.

Since the preceding was written we have seen the following estimate of the crops of 1855, by Mr. D. Jay Browne, the experienced and accomplished Superintendent of the Agricultural Bureau at Washington. No one has better facilities than he, and no one will be likely to be more accurate. He regards these estimates rather within than over the truth, both as to quantity and value:

VEGETABLE PRODUCTS OF 1855.

	Valuation.	Total value.
Indian corn,	600,000,000 bushels, at 60 cts,	$360,300,000
Wheat	165,000,000 bushels, at $1.50,	247,500,000
Rye	14,000,000 bushels, at $1.00,	14,000,000
Barley	6,600,000 bushels, at 90 cts.,	5,940,000
Oats	170,000,000 bushels, at 40 cts,	68,000,000
Buckwheat	10,000,000 bushels, at 50 cts,	5,000,000
Potatoes (all sorts)	110,000,000 bushels, at 37 cts.,	41,250,000
Flaxseed	58,000 bushels, at $1.25,	72,500
Beans aud peas	9,500,000 bushels, at $2.00,	10,000,000
Clover and grass seed	1,000,000 bushels, at $3.00,	3,000,000
Rice	250,000,000 pounds, at 4 cts.,	19,000,000
Sugar (cane)	505,000,000 pounds, at 7 cts.,	35,350,000
Sugar (maple)	34,000,000 pounds, at 8 cts.,	2,720,000
Molasses	14,000,000 gallons, at 30 cts.,	4,200,000
Wine	2,500,000 gallons, at $1.00,	2,500,000
Hops	3,500,000 pounds, at 15 cts.,	525,000
Orchard products		25,000,000
Garden products		50,000,000
Tobacco	190,000,000 pounds, at 10 cts.,	19,000,000
Cotton	1,700,000,000 pounds, at 8 cts.,	136,000,000
Hemp	34,500 tons, at $100,	3,450,000
Flax	800,000 pounds, at 10 cts.,	80,000
Hay and fodder	16,000,000 tons, at $10,	160,000,000
Pasturage		143,000,000

DOMESTIC ANIMALS AND ANIMAL PRODUCTS.

	Valuation.	Total value.
Horned cattle	21,000,000, at $20 each,	$420,000,000
Horses, asses and mules	5,100,000, at $60 each,	306,600,000
Sheep	23,500,000, at $2 each,	47,000,000
Swine	32,000,000, at $5 each,	160,000,000
Poultry		20,000,000
Slaughtered animals		200,000,000
Butter and cheese	500,000,000 pounds, at 15 cts.,	75,000,000
Milk (exclusive of that used for butter and cheese	1,000,000,000 gallons, at 10 cts.,	100,000,000
Wool	60,000,000 pounds, at 35 cts.,	21,000,000
Beeswax and honey	16,000,000 pounds, at 15 cts.,	2,400,000
Silk cocoons	5,000 pounds, at $1,	5,000

A deficiency of supply is not, then, the cause of extravagant prices. We must look a little further for this cause. With this view let us make the following inquiry:

When will a merchant export our domestic productions? The answer, as already intimated, is, When he can buy at prices which, with the cost of freight, insurance, commissions, exchanges, &c., &c., will give him a handsome net profit. In other words, the price abroad, compared with the price at home, determines this.

But prices "at home" are not uniform. When corn is worth a dollar in New-York it is worth only half a dollar, perhaps, in Tennessee or North Carolina, and so on. Under such circumstances the cost of transportation is a controlling item, both as to price and as to its direction. The quantity exported will be affected by the amount of these various items of cost, and not merely by the amount in the country. It is nonsense to pretend that there is not an excess of all kinds of provision except potatoes; and this deficiency is the result of disease, and not the consequence of any peculiar condition of the markets of the world. Besides, the people have become accustomed to substitutes for this crop, so that the want of this is not sensibly felt. This view shows the importance of our railroads and other internal communications which tend to equalize prices even in distant parts of the country.

Nor is it true that foreign crops are less than the average, but the reverse. The crop of Great Britain will be found on another page. The grain crop of France is snfficient not only for their own population, but for an additional population of 600,000. An estimate we have lately seen is 8¼ bushels of wheat to each inhabitant. In Germany and other countries there is no unusual scarcity.

Hence we might infer that there is not an excessive amount of exportation now going on, except so far as prices are affected by the Eastern War. The year 1854 was somewhat remarkable for the amount of wheat exported. Official returns give us the following amount of exports of this grain:

1851	13,948,499	bushels.
1852	18,680,686	"
1853	18,958,993	"
1854	27,000,000	"

This excessive exportation no doubt affected in some degree the price of flour and wheat through the past year. But with the supposed product of 1855, even that amount of wheat may be exported, without leaving a short supply at home.

But there is another part to this story. We are so much accustomed to the use of various kinds of grain that if wheat or any other crop is excessively high, substitutes can be easily found quite satisfactory to the most fastidious. How various are the modes of preparing the flour of maize; and he who cannot relish these kinds of food, when properly prepared, must have a very singular taste. This substitution diminishes the demand and affects the price.

But we again repeat, in this connection, that there has not been a lack of wheat during the year 1855, and that so large quantities have been in the control of speculators that they have had very hard work to satisfy the people that the country was in a starving condition, so as to secure such exorbitant prices.

In this connection we may refer to the record for evidence that our mer-

chant princes are somewhat reckless in the extent of their speculations, venturing very great risks in the hope of a fortunate turn of the wheel; and the presumption is that ere long the tide must turn against them, or—the only alternative—importations must cease for a time. Since the warehouse system went into operation, the amount of goods in the several warehouses has been constantly increasing—a conclusive proof that importations are excessive. More goods are imported than the market requires. The importer is not obliged to pay the duties, which amount to many millions, till they are removed from the warehouse, but he does lose the interest of his money. Thus the following are the amounts in warehouses in certain years:

1849	$47,970,658
1850	57,052,157
1851	67,516,888
1852	70,901,028
1853	96,916,080
1854	105,762,014

Our exports of domestic goods and manufactures have also increased, but not to the extent of the increase of imports here indicated.

Our conclusion from this extensive view is that prices are high from the wild spirit of speculation. Under ordinary circumstances this might not be possible. But the "famine" not quite forgotten, the Crimean war, the "drought," "half a crop," &c., &c., a terrible array of horrid things have been made to play upon the intelligence of the people, who knew that all these things did really exist somewhere, and to some extent, and they were led to believe the whole story.

But even under all this pressure it has been in the power of any community to buy at very reduced rates, simply by excusing one or two middle men from playing their part in this great game on the credulity of the people. Have not unions furnished their members with flour at greatly reduced prices? Have not producers every day of the year sold at rates quite as low as in the average of the last ten years? We know that this is true. To undertake, therefore, to refer the effects of all this reckless trade to European wars, or droughts, or any other natural cause, is only to play into the hands of monopolists and gamblers. The game is a great one, involving millions. It is for the people to say when it shall terminate.

To Prevent Trees from Splitting.—For preventing forked trees from splitting under weight of fruit, Isaac Lewis, of Hopkinsville, Kentucky, has given us his plan. "My plan," he writes, "which I have followed for thirty years, is this: When I find a forked tree that is likely to split, I look for a small limb on each fork, and clean them of leaves and lateral branches for most of their length. I then carefully bring them together, and wind them round each other. In twelve months they will have united, and in two years the ends can be cut off. The brace will grow as fast as any other part of the tree, and is a perfect security from splitting. I have them now of all sizes, and I scarcely ever knew one to fail to grow."

AGRICULTURAL STATISTICS OF THE UNITED KINGDOM.

THE following table, which we compile from the Belfast (Ireland) *Mercantile Journal and Statistical Register*, is an estimate of the extent of land in the United Kingdom under the principal description of crops in 1850–'54. It exhibits the acres in crop, total produce, produce under deduction of seed, and total value of crops:

Crop.	Acres in crop.	Total produce. Quarters.	Produce under deduction of seed. Quarters.	Total value.
ENGLAND.				
Wheat	3,000,000	11,250,000	9,642,857	£20,696,428 5
Barley	1,000,000	5,400,000	4,628,572	6,248,572 4
Oats and Rye	2,000,000	9,000,000	7,714,286	7,714,286 0
Beans and Peas	500,000	1,875,000	1,607,143	2,250,000 4
Potatoes, turnips, rape,	2,500,000	.....	.....	26,000,000 0
Clover	1,300,000	.....	.....	.....
Fallow	800,000	.....	.....	.....
Hops	50,000	.....	.....	780,000 0
Gardens	250,000	.....	.....	3,750,000 0
Total	11,400,000	27,525,000	23,592,858	£67,439,826 13
SCOTLAND.				
Wheat	350,000	1,137,500	947,917	£2,038,021 11
Barley	450,000	1,800,000	1,500,000	1,950,000 0
Oats	1,200,000	6,000,000	5,000,000	5,000,000 0
Beans and peas	50,000	150,000	125,000	175,000 0
Fallow	100,000	.....	.....	.....
Potatoes	200,000	.....	.....	.....
Turnips	450,000	.....	.....	7,700,000 0
Clover	450,000	.....	.....	.....
Flax	5,000	.....	.....	75,000 0
Gardens	35,000	.....	.....	525,000 0
Total	3,290,000	9,087,500	7,572,917	£17,463,021 11
IRELAND.				
Wheat	400,000	1,200,000	1,000,000	£2,000,000 0
Barley	320,000	1,120,000	933,334	1,119,999 12
Oats	2,200,000	11,000,000	9,165,667	9,166,667 0
Potatoes	1,400,000	.....	.....	11,200,000 9
Fallow	300,000	.....	.....	.....
Flax	140,000	.....	.....	2,100,000 0
Gardens	25,000	.....	.....	300,000 0
Total	4,785,000	13,320,000	11,100,001	£25,886,666 12
Grand total	19,475,000	49,932,500	42,265,776	£110,788,974 16

1. CONSUMED BY MAN.—Wheat, 15,500,000 quarters; oats, rye, and maslin, (a mixture of rye and wheat), 10,650,000 quarters; barley for malting, food, etc., 6,000,000 quarters; beans and peas as meal, 700,000 quarters; total quarters, 32,850,000.

2. CONSUMED BY THE LOWER ANIMALS.—Corn, principally oats, used in the feeding of horses and other animals, in distillation, manufactories, etc., 16,320,000 quarters; total consumed by man and the lower animals, etc., 49,200,000 quarters.

It is seen from the former estimate that the corn produced in the United

Kingdom, applicable to consumption, amounts to only 42,265,770 quarters. But to this has to be added foreign corn annually entered for consumption at an average of the seven years ending with 1852, viz.: wheat and wheat flour, 4,231,185 quarters; barley, 870,786 quarters; oats and oat-meal, 1,162,546 quarters; rye, 99,510 quarters; peas and beans, 565,759 quarters; total quarters, 6,929,786; total consumption, 49,196,556 quarters.—*Merchants' Magazine.*

THE TRUE POLICY OF THE SOUTH.

[The sentiments we expressed in our last issue, as in former numbers, are powerfully sustained by the following extract from the Austin (Texas) *State Gazette*, and which is copied into *De Bow's Review*. We cannot see how the South can be ignorant of their possibilities, or knowing them, neglect them much longer.—Ed. P. L. & A.]

"In our issues of the past two weeks we endeavored to show that the population and wealth of the Northern States have resulted from their manufactures and internal improvements, and that the comparative weakness of the South has resulted from the want of them. We believe that our readers who have read those articles have come to our conclusions upon the subject. Who believes that the State of Massachusetts would have, on the small extent of 7,500 square miles, one million of population; that her real estate would, in 1850, have been valued at $349,129,932, but for her manufactures, which, at that time, gave employment to 162,928 of her people, and her railroads penetrating into every part and portion of the State? In consequence of the demand for the necessaries of life, created by this aggregation of people, engaged in manufacturing, internal improvements, and the various pursuits incidental to and dependent upon them, the Massachusetts farmer will spend three hundred dollars in removing the rock and stones from a single acre of land in order to cultivate it, and finds it a profitable investment.

Reasoning, from cause to effect, of the future by the past, it will be easy to demonstrate the consequences of an extensive system of manufactures and internal improvements in the South, not only upon our own section of the Union, but upon the North and also upon Europe.

As in the Northern States, manufacturing towns and villages would spring up on all our streams capable of running a mill; employment would be given to millions of operatives, cities would grow up at the termini of our railroads, and every depot would become a considerable town or village; hundreds of other occupations and pursuits would result, giving profitable employment. These things would again act upon the agricultural interests of the country, by affording a demand for the necessaries of life, and a home market for our great staples, and the facilities for cheap and rapid transportation; the products of the farmer and the value of real estate would be immensely increased.

Our commerce would undergo a perfect revolution. We now export the raw material, which is manufactured in New-England and Europe, and enters into the clothing of a large proportion of the world. We would

then export the manufactured fabric, having in our own hands a complete monopoly. We now furnish two-thirds of the exports of the United States, and have permitted northern capitalists, factors, and brokers, to subject us to tribute, in forcing those exports through their hands, instead of allowing them to pursue a direct and natural course. Our exports form the basis of two-thirds of the imports of the Union, which are landed in northern cities, and enriching them at our expense. We would, then, by exporting the manufactured article, and manufacturing a large amount of what we now import, redeem ourselves from our present vassalage and thraldom.

The millions now paid by the importing merchant by way of tariff, and which is repaid to him with a per cent. by the Southern consumer, would be cut off, and cease to be an everlasting drain upon the currency of the South.

The tide of European emigration would be diverted from the North to the South, and the millions of money and thousands of operatives now annually arriving there would be invested and employed here.

Let the South but adopt a system of manufactures and internal improvements to the extent which her interests require, her danger demands, and her ability is able to accomplish, and in a few years Northern fanaticism and abolitionism may rave, gnash their teeth, and howl in vain.

The effects upon the North would be equally striking. The South can manufacture cheaper than the North, as we design to show hereafter. We would then produce those articles of home consumption which she now sends us. Southern manufactures would be able to enter the markets of the world, and undersell those of New-England and Great Britain; and that fact once demonstrated, the increase of our production would be commensurate with the wants of the world. The millions which the North annually receives from the South would be cut off. She would no longer be able to levy tribute upon us.

The whole revenues of our government now paid by the Southern consumer, but collected and disbursed at the North, would be levied more justly and distributed more equally.

Let northern folly, bigotry, and intolerance drive the foreign emigrant, the naturalized citizen, and the Roman Catholic from amongst them, it is the true policy of the South to receive them, granting them all the privileges extended to them by the Constitution and laws of our country. They will swell our population and increase our ability to defend ourselves against abolitionism and free soilism, which are but the correlatives of Northern Know-Nothingism.

The effects upon Europe, and particularly upon Great Britain, would be equally striking. Our Northern manufacturers are now able to enter into the markets of the world, and undersell those of Great Britain. The Southern manufacturer could do it with more ease. In time, instead of shipping three millions of bales of cotton to Europe to supply her manufactures, as would ship that amount of fabrics. Our facilities for manufacturing cheaper would enable us to undersell and monopolize the market; this would draw the European operatives here, who could not be as profitably employed there. The consequences to European, and particularly to British manufacturers, can easily be perceived; they would be crippled, if not prostrated."

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

SOUTHERN PRODUCTIONS.

COTTON PATCH, Dec. 21, 1855.

DEAR SIR:—With many thanks for your kind notice of me on page 259 in your leader for November, which I have only this night cut the leaves and hastily glanced over, I beg to say a little.

I do not like comparisons. I less love that spirit that leads to bring one portion of our country antagonistic to the other. Some one said long ago, "Comparisons are odious." Certainly they lead to unkind feelings. What matters it if the little State of Rhode Island does make more than South Carolina? I very much query whether anybody in that dear old State sleeps less or eats less if knowing or not knowing this to be true.

My own opinion is, that no country does wisely when it relies upon any one article, or even is bound to trade at any one point. I therefore advocate some diversity, and urge manufactures as a part of our business. Had I to choose agriculture for my brethren of this State, or manufactures, or trading, I should unquestionably, without a moment's hesitation, choose agriculture. I speak, nor write, nor act as will please the mass; I give my opinions not intending offense, but I know many will shrug the shoulder. I hope that agriculture will ever be the leading business in the South. I hope before other pursuits become paramount that my day will have been long past. If the South would diversify labor to a greater extent, we would certainly be more independent. As to the matter of dollars and cents, it comes not into my calculation, farther than as secondary, in providing necessaries, comforts, luxuries in a small way and improvement in its best phase.

But, sir, I advocate fostering our own mechanics and artizans, schoolmasters and preachers, make a part of our clothing, and shoes, and hats, and so on to the end of the chapter, even if it includes making "rolling-pins" and "axe-handles," raising mules, etc. Should we only do this to an extent of $33\frac{1}{3}$, we will thus be able to withstand pressures and not be driven to the wall. If I make $\frac{1}{2}$ or $\frac{2}{3}$ of the pork I need, I can pick my time to buy the balance, and thus with all else. I contend every country should do this to a greater or less extent. My friends—many of them—have held it unwise to thus enter into competition with those who buy our cotton. They say, if we make everything we want, no one will buy our cotton. Very true, perhaps, but we cannot make all we want; we must have a great deal after we have done all we can.

But, another matter as regards these comparisons. Admit that my land does not produce a per acre yield as it did in 1835, does it prove anything in favor of increased cost of production? Suppose some calculator makes cost of production to be 8 cents a pound, does even that prove we are getting beautifully smaller day by day? Cotton costs me 8 cents and I sell at 8 cents, and pay cost of selling, a part at 7 cents and so on,—figures lie not,—yet property is being rapidly accumulated all around me by cotton planting alone.

Let us look at the figures and facts. In 1830 to 1835, a crop of 15 bales per hand never entered into the heart of man to hope for. I know the rich lands of the cotton region. Eight and ten bales was a matter of doubt, many living within 20 or 30 miles of the "Swamp" did not believe it. Now

we can turn out our 10, 12, 15 and 18 bale planters. Suppose my lands make only now an average of 1000, whereas in 1830 they made 1500, what does it prove? In 1830, I planted 6 and seldom 8 acres, worked as hard, aye, harder, than now with my 10 to 12. A full crop then was 6 or 7 bales, now I do not regard 8 bales a full crop, and more corn made too. Again, my friend, Dr. M. or Dr. B. or Col. D., etc., who make 1000 to 2000 bales, they make at 8 cents and sell at 7, losing 4 to 8 or 10,000 per year, yet with proceeds of crop invest 10 or 20 or 30 or 40,000 per year. I have cyphered up the cost of raising a hog or a colt, and lo! the hog or colt would eat its head off every year. I have cyphered up the cost of raising a negro from babydom up to 21 years, and find doctor's bills—they are longer and sharper than musquitoes—and clothing, and nursing, and feeding will eat up a dozen babies; but when I see my woman seamstress—who has been with me since my boyhood, and count up her children, worth in cash say $3000, with her service for some thirty years,* I come to the conclusion that I am a badly broke man, even with enough around me. It matters not to me what Rhode Island, or Illinois, or Connecticut, or anywhere else makes. I only ask of one and of all to let us be. I hope for them as much happiness as I know I enjoy. I am a Southerner by birth and attachment. "I would not live elsewhere," yet I have no desire to injure, or see injured, any part of our country. If we are not so rich, we are as content.

Yours, as an American, P.

ERRATA 27th page, 4th line from bottom,—on an *old* settled plantation. Last line in paragraph before last—long *shaves*. Commission merchants charge 10 per cent. interest—7½ for accepting, and 2½ for advancing; they pay 6 or 7 perhaps—this is long, rough and tough shaving, but all our own fault.

NOTE.—The object we have in view in setting before one section of country what is done in another, in the way of valuable products, is for the purpose of showing that there is a better way. If a section of a hundred square miles makes more money than another of a thousand, the best way that we know of to bring up the latter to proper effort is to show them how much better others do than they, while they can do as well as anybody. We have yet to learn why this is not a legitimate and effective kind of argument.—ED. P. L. & A.

SOUTHERN PICTURE—CROPS—POAGUE'S WATER PIPES.

NEAR BROWNSBURG, Rockbridge Co., Va.,
25th December, 1855.

TO THE EDITOR OF THE PLOUGH, THE LOOM AND THE ANVIL:

DEAR SIR:—The numbers of your valuable agricultural journal for October and November did not come to hand, and I supposed it to be discontinued.* The December number reached me a few days since, and I now suppose it to be maladministration in the post-office, as our Post-Master General has been often, no doubt, imposed on, and many good post-masters have been turned out for daring to think for themselves and vote like freemen, and

* A few of my first years, when she was 17 to 25, she was a field-hand, and made her 6 bales.

their places filled by men incompetent to discharge the duties of the office. The consequence is confusion, and great irregularity in our mail receipts. I could state a strong case of this kind, where eight or ten individuals succeeded in turning out a most reputable, gentlemanly man, for no other reason than that he voted with the American party, when nineteen-twentieths of the community petitioned that he should be continued in office, after it was known a secret clique were plotting his removal. But enough of this. We are reaping the fruits of maladministration in the distracted proceedings of the members elect to our present Congress.

Permit me to present to you the compliments of the season, and to wish you a merry Christmas and a happy New-Year! If the weather is with you as it is with us, it is gloomy enough. We have had no snow up to this day, with but little cold weather. The 23d of December was almost as balmy as May, the mercury standing 53° at daylight. Yesterday was cloudy and rainy, and to-day no better. It is now noon, and raining fast, with some fog. There has been but little feeding of stock cattle. Sheep require no attention, further than soiling. The season for killing pork and beef for our next year's home consumption has nearly gone round, and with our corned-meat houses well stored, and with a general good supply of money, if not all the comforts of life, we may at the close of another year render up to the Father of our spirits, and the Giver of every good gift, the homage of grateful and thankful hearts, for the many blessings which God in his goodness has vouchsafed unto us as a nation and a people. True, a small portion of our State has been sorely afflicted, but has it not shown and brought forth the sympathies and alms of a great and good people throughout the length and breadth of our land? May God be praised for his goodness unto us for the past year, for his blessings have been many!

This is a high day with our servants. They are as joyous and happy in preparing their Christmas dinner as if they had corn to sell. Could your fanatical zealots see their shining happy faces and white teeth, as they pass around the merry joke and Christmas song, they would be more sparing in their calumnies against the South; and I will venture my reputation on it, a better fed, better clothed, and, as a general thing, a more contented working population than our servants are, does not exist in the United States, or anywhere else, than is to be found in the valley of Virginia.

The corn crop of the season has been very good, and almost every farmer has a surplus. There will be many fine beeves fed in our valley this winter. The crop of wheat was short, and is pretty well ground out. The quality was good, but in many places did not reach half a crop. The oats and rye crops were not abundant, but will be quite ample for home consumption. Pork was not plenty, but was well fatted, and will be of fine quality. All culinary vegetables plenty. Apples a fair crop, but fell off early, and incline to rot.

I made a fine crop of corn this year from a piece of up-land of medium quality. It was a clover bog of three years standing, the clover pastured off; the soil a sandy loam; the land was ploughed in the winter; the ground was harrowed in April, laid out four feet wide, and planted two to three grains in the hill, two feet apart. (It would have been better to have had one stalk at a place, nine inches apart.) The stand was pretty good, but in some places was too thick. As soon as the corn was well up, a coulter was run next the plants, to the depth of ten inches. The cultivators followed the coulter, giving the field two dressings; and a part of field was gone over the third time with cultivators. The wet season now set in, and two-thirds of the

field received no further work than going over twice with the cultivators. The field (about twenty acres) averaged about fifty bushels per acre. This was a fine crop for the labor bestowed on it, the corn being ten to twelve feet high.

I will now give you some account of a cheap, and, as I conceive, most excellent water-pipe, introduced in our County a few years since by I. B. & W. F. Poague, of Rockbridge Co., Va.

I had the water conveyed to my house last spring, a distance of four hundred yards. The ditch was cleaned out by my hands in April, at a depth of two feet, where rock did not interfere. I procured one hundred bushels of cement, which was furnished by Messrs. Poague at the kilns for twenty cents per bushel; transportation by my team worth about twelve cents per bushel. Messrs. Poague's hands commenced work on Monday, and in four days the pipe was laid, four hands laying one hundred feet each day. The pipe was moulded in the ditch, and is composed of one-half hydraulic cement and one-half pure sand. About half-bushel of each is mixed together by two men, and as soon as properly worked, is laid down in the mould with trowels. If the weather is warm, and the water used from a branch, it will set in ten to twenty minutes. The rod, seven feet long, is turned in the cement before it sets, to keep it from sticking, and as soon as the mortar becomes hard is drawn out, the moulds uncased, and removed for another joint.

My spring-house adjoins my house, and we have not to go out of doors to get water in bad weather, but go from the kitchen, under a covered way five feet, into the spring-house. Here the water falls about two feet into hydraulic cement troughs, built across one end and one side of my spring-house, the depth of water being six inches where it enters, and ten inches where it discharges through the wall into a beautiful basin or pool, holding six or seven hundred gallons; thence passing across my yard in a ditch into my orchard. Messrs. Poague's bill for troughs and four hundred feet pipes, $1\frac{1}{4}$-inch calibre, was $100. Cost of spring-house $125; and I have what I would not be deprived of for $1000.

Messrs. Poague having sent me one of their handbills, I enclose it to you, and entirely concur in what is therein stated.

Your obedient servant, &c., HENRY B. JONES.

SANITARY EFFECTS OF CHARCOAL.—As an illustration of the sanitary powers of charcoal, and the extraordinary energy with which it acts upon the gases, thus furnishing a new power for removing the agents of disease, etc., Dr. Stenhouse has exhibited in London a machine showing extraordinary deodorizing and disinfective powers. An atmosphere rendered highly offensive by putrefactive decomposition going on within the chamber in which it is confined, is drawn through charcoal filters, by means of a rotating fan machine, and is passed into an apartment adjoining. Although this air is disgustingly fœtid, it flows out into the room perfectly free from smell. This experiment, though it exhibits no new property of the charcoal, places the fact in a strong light, and may lead to most important usefulness.—*Horticulturist.*

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* Our friend's name will be one of the last we shall voluntarily "discontinue," and if any number is not received, he, and others also, are requested to make it known to us. We can generally supply them forthwith.—ED. P. L. A.

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

PLANTATIONS IN THE SOUTH.

[The writer begins by some suggestions in reference to the "M. D." of the tourist author of "Inside View of Slavery," and considers it very properly of little value in such a connection, and then proceeds to speak of the actual condition of the industry of the South, as follows.]

——, Miss., Dec. 24, 1855.

As to "inferior tools," "rotation," or the culture pursued, we ask the thoughtful readers of the Northern States, if we could not point to farms even in the great and improving States of New-York or Massachusetts where there is the very worst sort of economy pursued. There are men who realize more money to capital than in most portions of our land who have poor implements and know nothing of rotation. They laugh at "modern improvements." Is this not so everywhere? We in the South do not manage as economically, as wisely, on the whole, as do our Northern brethren, we acknowledge. We would have the South as liberal in good implements, as generous in feeding her soil, as she is kind and hospitable to her visitors. We dare not put in any plea of abatement when our dear native land is in fault. All thinking people will know that the time must come when we must attend to our planting matters more systematically, artistically and scientifically. It is necessity forces men to labor, to improve. We are, by the fiat of the Most High, to earn our bread by the sweat of our brow; yet when land will produce such by but little sweat, depend on it man will not sweat much.

When traveling west, some twenty years ago, we saw so many of the population in bed in the coolest part of the houses, that we thought it "dreadful sickly," and spoke of it. Our journey was in June and July, and we were told that the people were only taking a comfortable nap in the hot weather. There is felt the same necessity of economy, toil and management in many portions of the South that is said to be in former days among the island planters of the Gulf. The day of action, of progress, is even *now*—not at hand, nor near at hand. Many are forced to attend to drains, horizontalizing, ditching, manuring, rotation, etc. And when the spirit is up as in New-York and Massachusetts, you will see deeds as worthy of the South as at Chepultepec, Cerro Gordo, Buena Vista, in the Halls of Congress, or elsewhere.

We do not compare our talent, or riches, or worth, or anything with any other people. We complain of none. There are some of us here whose great grand-sires, (or, perhaps, as in one case, g. g. g. grand-sire,) came from Wales, or England, or Ireland, or France, and settled in the South, but there are many here from the North and East and West and abroad, as well as the South, and we soon fall into the same way. All that we claim, being of similar origin, is,—give us the same objects, and we can evince talent and energy and zeal. The time has been when savans held that the South would depreciate wool, color of skin, intellect and so on; but that day is past. The South has sent out proof to the contrary.

Send a practical man to a well-ordered cotton or sugar or rice plantation, give him time to examine the internal economy, and let him examine the best. Go West and examine the best hemp farms and stock farms. Then visit

the best at the East or North, and you will see not much difference after all.

To-day we can show you white single hyacinths, tea-roses, spirea, etc., in bloom, cotton leaves green, and our mules not yet housed for the winter. An M.D., who would be traveling through in the cars, or otherwise, would pronounce it bad economy, because horses in Dutchess Co., N.Y., must be paired on the 24th of December.

Our houses have no preparation for winters, they are for summer. If the South could be entreated to arouse herself we would entreat; if she could be abused to it, we would abuse, though we had to affix two rattles to our

P.

[We are disposed to add a word to the preceding expressions of opinion by our valued correspondent. We are quite certain he is right when he says, "it is necessity that forces men to labor to improve." But we doubt not our friend also would have added, had his object led his thoughts in that direction, that when present necessity does not urge us to effort, the offer of valuable profits will be efficient in exciting us to labor diligently and wisely. Give the North or the South a convenient and ready market for her agricultural products, and those products will be raised. The best and only way of introducing wholesome improvements is to satisfy the landowner that those products will pay for the exertion and the expense. Hence the necessity of variety of employment, that all kinds of producers may find, near at hand, consumers who will buy. It is in vain to preach modern improvements to those who cannot produce without great effort and at the same time know not what they could do with their products, or what they would sell for, when ready for the market.—Ed. P. L. & A.]

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

AGRICULTURE IS KING.

TO THE EDITOR:

In your periodical for December last is an article, the first in that number, with the title "Commerce is King,"—a title to which, with all due deference to other opinions, it must be allowed by many it has no claim. This idea, like many others, is a sort of modern adage, which the history of the past and present proves to be false.

That commerce has its advantages we are willing to admit, but that it ever has been, or can be the basis, the pristine cause of national prosperity, is a fallacious impression. It may with greater propriety be termed the handmaid, the attendant upon agriculture, for the disposal or removal of a surplus produce. Wise legislators have given it their protection. It is the only means by which a nation can repair the waste and ruin of war. Yea, far better that a whole fleet should rot in the harbors than our acres of land should lay unbroken and unsown.

In reviewing the history of ancient nations, it is evident, their most prosperous periods were when agriculture was carried to its highest pitch of improvement. We wonder at the vastness of the area of space enclosed within the walls of Ninevah and Babylon; but it should be understood, the ground thus not occupied by buildings was tilled, whereby the annual pro-

duce could sustain the inhabitants when besieged by an outward foe; its rulers being well aware that the strength of ramparts and walls was useless if the means of sustenance could not be obtained. The fruitful valley of the Nile was the source of the greatness and the wealth of Egypt; nor is it strange that this people, with no divine relation, should regard this river the chief among their divinities.

During the long civil wars of Rome, agriculture was neglected. For a time, the victories of the arms of the republic brought the fruits of their conquests into Italy, which for a time prevented the evils of neglected husbandry being felt. But when Augustus was peaceably settled upon the imperial throne, and Virgil was known at court, the poet was requested by Macænas to write a work upon agriculture, that his melodious numbers might rouse the spirit and enkindle a taste for rural occupation. The result was the production of the Georgics, in four books, entitled, "The Cultivation of Lands, Raising Vines and Trees, Rearing Cattle, and the Management of Trees." It is said, that soon after the publication of this work, the improvement of the lands in Italy was such as fully to repay the labors of the poet, and met the highest expectation of the government.

Again, when God promised a country to the descendents of Abraham, it was not to be a land of ships, commerce, merchandise and metals, but a land flowing with milk and honey; and the happiness of the people is portrayed by the phrase, "Every man under his vine and under his fig-tree." When that kingdom was in its zenith under Salomon, the royal table for one day's supply only was thirty measures of fine flour, sixty measures of meal, ten fat oxen, and twenty others taken from the pastures, one hundred sheep, besides harts and roebucks, fallow deer and fatted fowl. This abundance demonstrating the richness of the soil, as the source whence their prosperity flowed.

The panic sometimes felt in European States plainly shows what branch of industry sits as king. Let a battle be lost, a city consumed by fire, pestilence desolate a section of the country,—the money-market becomes stringent. These are but short evils in comparison with the failure of an harvest; for the common but good adage will ever hold good—"Stop the plough and you starve the world."

The stability and security of governments often depend more upon the yield of the soil than upon all the laws and edicts of rulers. The bloody acts of the French Revolution were hastened by the dearness and scarcity of bread. France had at that period her shops and her commerce, and her manufactures *then* as *now*, were unrivaled; but all failed to arrest the storm of crime and murder, as long as the agricultural products fell short of a sufficient supply.

We used to hear a great deal of the corn-laws of England, the object of which was to give the farmer a remunerating price for the crops he raised; and although the policy might be a mistaken one, it arose from the conviction that if the farmer could not live no other branch of the community could prosper; thus awarding to agriculture the legal appellation of king, not as a name of empty pageantry, but one by divine right.

But while thus elevating agriculture, we are every way willing to allow to commerce every means of usefulness to which it is entitled. Tyre, Sidon and Venice are names immortalized by it. Their once-active and widely-extended commerce, and latterly the discoveries and trading pursuits of Spain and Portugal in the 17th century, for a while gave a sort of spasmodic elevation to these countries, but inasmuch as the tillage and improvement of the

soil was not the basis of their prosperity, their high station among the nations was brief and transient.

The great and useful idea advocated by your periodical, viz., that where the article is produced it should be manufactured, is an obvious truth; and yet how unwilling communities are practically to act upon it. The South has often been reproached for her slow progress, compared with that of the Northern States; yet would the grower of cotton pursue the same plan a neighboring farmer did near me, that reproach would soon cease. This wise tiller of the soil finding the price of wool low took his fleece to the manufacturer near by and had it made into cloth, and thus realized a much better market than if he had sold the raw material.

In the words commerce, ships, princely merchants, there is a bewitching, false idea that captivates the mind. Napoleon said he must have ships, colonies and commerce, but failed in them all. Had he turned his active and mighty genius to the internal prosperity of France, and permitted agriculture rather than war to be king, he might perhaps even to this day have swayed the scepter of the French nation.

It is these false ideas by which such numbers of our youth are influenced to speculate in trade and commerce rather than follow the less esteemed, more slow, but safer and more useful method of gaining a competency with pursuits of agriculture. There is a false scale of respectability often applied by the merchant, who is doing business upon a large scale, with borrowed capital. His appearance and standing in society, his capacious rooms for business, his large and imposing stock, all elevate him in the eyes of the community. Yet the indivitual who earns his bread by the sweat of his brow, who buys of this merchant a single article and pays for the same, is often in reality the owner of more dollars.

It is not a rare thing for young men to commence business as merchants with no capital of their own, do a great business for a time, and then fail,—offering to their creditors a few cents upon the dollar. Such persons lose nothing because they never had anything; but others, deceived by a false appearance, trusted them, and became the sufferers.

Communities, like individuals, should endeavor to do their work at home. An extensive exportation never enriches a nation unless an equally valuable return is brought home, especially when the same article has to be sent back with all the expense of freight, manufacture, etc. But by bringing the hands to us, the farmer is benefitted by the increase in the number of the consumers of their produce. The manufacturer is also placed in a position to add to this wealth, and both parties mutually depending upon each other, the whole community is bound together. R. S.

Fulton, Wis.

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

"COMMERCE IS KING."

Who makes it king? The Farmer. Who feeds and clothes the world? The Farmer. Who are the subjects of the commercial king? The Farmers. In whose power does it lie to dethrone this king? The Farmer's.

We constitute ourselves one of the "jury of doctors" called for in the

December number, not to give the pathology and diagnosis of the "ruinous evil," but we will prognosticate a cure, and propose a remedy, so that the sufferers may be relieved.

The remedy consists in a revolution, and a new declaration of independence, to be signed by every farmer in the Union.

Let there be formed, without delay, an Agricultural Society in every County in each State, and State societies, composed of delegates from the County Societies. When these are formed, let there be a general assembly, composed of a delegate from each State society. Let the general assembly enact laws to govern each and all, and fix a standard permanent value on each staple production; the value to be reasonable, and at the same time remunerative. For instance, wheat $1.25 per bushel; corn 60 cts.; wool from 30 to 60 cts., as to quality; cotton 10 to 15, etc.

Let the general assembly also cause reports to be made by each State Society, these reports to contain accurate statistics of the amount of each staple raised in every State.

This scheme may at first sight appear visionary, but we think we can meet every objection, except such as may be brought by the courtiers of the commercial king. For example, they will say that it will prevent their pocketing all the profits made on farmers' produce; but we do not care a straw if it does.

It is high time that the farmers were waking from their Rip Van Winkle sleep; it is high time their eyes were opened and their energies taxed, to overthrow the monster who has fattened to such huge proportions on the profits of their toil.

Is it not absurd and cowardly for the farmers to allow merchants, who depend on them for their food and living, to set the price on their produce, and at the same time fix the value of their own merchandise? Why not trade fairly; at least allow the farmer to price his own commodities? Or, if they will not *allow* them to do it, we say, Farmers, charge a just price, and starve them into subjection. Yes, it is in the farmers' power, if they will unite in one harmonious whole, to control those merchants and manufacturers who are doing all in their power to crush them to the earth. See the effort being made by the manufacturers to annihilate the tariff on wools.

The "wool grower" asks, "What is to be done?" We say, Let a new party of American patriots be formed, to be composed of the honest farmers and mechanics, and let their motto be, *Union* and our own *rights*. Let them crush the factions and isms of the day; let them elect such men to Congress as will bind themselves to protect American industry, whether mechanical or agricultural.

Our country will never be superlatively prosperous until a high tariff is imposed on all foreign articles. We are independent of England and the rest of the world; therefore let us make our own iron and cloths, and protect them, so that the foreign cannot compete with the domestic; and we will guarantee that the farmers will thrive, the mechanics will thrive, and we will permit the merchants and manufacturers to thrive too, although they want to rob us of everything we raise. It is to our interest to let them thrive, for the more we have to feed and clothe, the more profitable our manly calling. What would the farmer do with his surplus wheat and corn, if all were farmers? We want as many mechanics as we can get; the more the better. What if we do have to pay more for manufactured articles? Why, we can afford to, if we have a pocket full of "rocks!"

Farmers! wake up, and keep awake. Do not let this plan fail for the

want of energy. Do not read, and then forget, but go to work. Now is the time. Form societies as fast as you can; make your resolutions, and let it no longer be said that you are blind and asleep, and slaves of the rest of mankind.

This is a charitable plan, as well as a plan to secure your own rights; for it will prevent that monopoly which starves the poor. If merchants wish to speculate on our grain, let them do so in foreign lands, but not in this.

We request other agricultural journals to copy this for the benefit of their patrons, and that the ball may be kept in motion.

Respectfully, etc., G. W. VARNUM.

WAYNE, Lafayette Co., Wis., Dec. 22, 1855.

NOTE.—The object of the writer of the above is most praiseworthy, and his plan worth careful attention. The formation of unions, in counties or other convenient districts, who shall advance a given sum on all marketable products not perishable, and who should sell them only at limited prices, would be a very efficient antagonism to the system of private speculation now so efficiently and extensively carried on by middle men, all of whose profits ought to go into the hands of the producer.

Merchants and manufacturers are very much, we suppose, like "other men," securing all the profits they can honestly get, whether the producer is paid or not. They have regard too often for half only of the maxim "live and let live." We cannot doubt that some plan may be devised which shall secure a much larger share of the profits now actually made by traders, for the benefit of the producers.—ED. P. L. & A.

MANURES—THEIR APPRROPRIATE USES, ETC.

MANURE is indispensable to the farmer, to ameliorate the soil and increase its profits. But he should understand the nature of the manure which he uses, and have due regard to the quality of the land to which it is applied.

Manures vary in character, as bone-charcoal, lime, clay, ashes, poudrette, &c.

Manures are divisible into two classes; cooling and fertilizing, and heating and fertilizing. The first includes the excrements of neat cattle and sheep; the second those of the horse, the goat, the hog and domestic birds. Arranging manures according to their heat, beginning with those of the highest temperature and descending, we have the dung of pigeons, hens, turkeys, ducks, geese; then that of the hog, goat, horse, mule, ass, and neat cattle. These ought to be used on light soils, and for pulses and the like, as cabbages, &c. Argillaceous soils require mixed manures, as those with that of the horse, but they should be well made. Sandy soils need the dung of cattle mixed with that of the horse. That of the mule or the ass is not suited for such, nor that of birds. It is not well to mix the dung of hogs with that of other animals, as it tends to propagate nettles; but this should be reserved for marshy lands. It tends to dry them and renders them productive.

1. Manures may be prepared by the farmer in the following manner:—The dung of cattle and the horse may be carried during the winter into a field and laid in a heap; and if near large villages he may also bring horses unfit for use, and dead horses, and if still living they may be killed upon the heap by cutting their throats, their blood being soaked in the heap. After they are skinned, they should be cut in pieces, and being placed on the pile, be covered with it, or with straw, &c. The heap may remain thus till it is

wanted. Thus prepared, not more than a third part will be required, of what would be necessary when used in the common way. This is not an expensive process; any sort of dead animals, cattle &c., might be used in a similar manner. This manure is suited for sandy and gravelly soils, and renders them productive of rye and oats.

2. *Bone-Charcoal.* It is well-known that when the bones of animals are burned in a heap, the result is bone-charcoal, but thus produced it could not be employed to enrich the earth. It is necessary that it should first pass through the hands of the refiner of sugar, who requires it, and it then becomes very valuable to the farmer. But he must be careful not to place it in grounds designed for potatoes the same season, since, according to my experience, by its remarkable absorbent properties, and its resistance of decomposition, it retards the growth of the tubers and tends to produce the disease called the potato cholera. In France, where great use is made of it, and it has an extensive commerce, as in Brittany, I have seen several vessels from Riga every year arriving, loaded only with this bone-charcoal.

3. *Marl* is a kind of soil, composed essentially of lime mingled with clay or sand. It is used for sandy, or low or marshy grounds; but for the first (sandy) it is necessary to choose marl which is composed of lime or clay. For there are two kinds of marl, one composed of lime mixed with sand, and the other with clay.

4. *Ashes.* This is used to enrich prairie ground and all moist or wet soils, which it tends to make dry and suited for vegetation.

5. *Human Excrements.* These are more rich in nutricious properties than other kinds, but it is not convenient to use them in their ordinary state. The vegetation produced by them, used in that manner, is apt to retain their odor, and they have a bad taste. Hence in France it is the custom to reduce them to the form of Poudrette. The manipulation of this is laborious and disagreeable. I have assisted, near Paris, beyond the faubourg of St. Denis in this labor, and am able to give an accurate description of it.

At a distance of 500 yards from the road leading from Paris to Brussells, is a spot devoted to this work. Carts which convey the excrements from privies drop them into a pit dug in the earth; water is then poured upon them and they are thoroughly stirred. Those who perform this service are clothed from head to foot in India rubber, without any openings except for respiration, and for seeing and hearing. Thus muffled, they walk into this putrid matter and mix it with their hands and feet. This service is very laborious, and the man who is employed in it is allowed occasionally a glass of brandy. When the mass is properly worked, it is suffered to remain at rest, and the water is drawn off. From this wet mass, small quantities are separated, and are dried in the sun or by the fire, and is afterwards converted into powder, is done up in papers and is called poudrette. A Kilogramme costs four francs; and, according to the nature of the soil, serves for one, two, three, or four acres.

It is necessary to add that it is not proper to mix with these matters any other liquid except urine, since other impurities are injurious in their effects; and contractors for this work, in such case, demand pay for their service, while, if the contents are free from other impurities, they do the work gratis.

Among other means used to enrich the soil, in Poland the following is practised. Upon good land, suitable for wheat and far from their dwellings, to diminish the expense of transporting manures, the ground is ploughed and sowed with buckwheat, and when this is in flower, the plough is passed

through it and buries it. In the autumn the ground is cultivated in the usual manner. SANIEWSKI FELIX.

[Translated from the French manuscript, by the editor of the P. L. & A.]

THE "FIRST PREMIUM" FARM.

THE Committee on Farm Management awarded $50 in plate to Wm. P. Ottley, of Phelps, Ontario Co., for the best managed farm. But two applications were made for this premium, though we think there are many farms which would have stood an equal chance with those which were presented.

The soil of Mr. Ottley's farm is a gravelly loam, and muck with a tincture of clay, the subsoil about the same, lighter colored and porous. Limestone scarce, the rocks found are granite and quartz. The farm contains 100 acres, 85 in cultivation. Mr. O. considers ploughing in clover the best means of enriching his ground. A three years' lay turned under in June for wheat, or the 1st of May with barnyard manure, for the corn crop succeeds well.

He ploughs from seven to ten inches deep, Deep ploughing in his case has a good effect in giving great room for the roots of plants, in its action as an underdrain, in preventing the effects of drouth, in making the land easier to work after it, with other advantages too numerous to mention. Some experiments showing this, and also the difference between shallow and deep ploughing, were made by Mr. O., and we may refer to them hereafter. In regard to subsoil ploughing, he says the effects were entirely satisfactory after the first year, when the crop was lighter than usual, from the poverty of subsoil before due exposure to atmospheric influence.

Manure receives considerable attention on the farm of Mr. Ottley. His straw, corn-stalks, and hay is all fed out in the stables and yards, where his cattle are kept through the foddering season. The straw serves for litter, and having an abundance, also about 65 head of horses, cattle and sheep, he makes about 200 loads of manure annually. This he draws out in a green state to his corn field, (usually planting 12 acres,) putting from 30 to 40 loads per acre, according to its value. It is dropped in similar heaps about one rod apart, and generally as fast as it can be ploughed in. He has a manure cellar, but keeps a part under cover, and finds it a decided benefit. For barley he thinks rotted manure an essential application; it is of such quick growth that it receives little benefit from long manure.

Mr. Ottley has from seventy to seventy-five acres annually under tillage. His fields contain about twelve acres each, and the different crops follow in rotation and culture as follows: For corn he takes a three-year lay of clover, covers it with manure, and breaks up immediately before planting with a double plough, eight inches deep, harrows with a light harrow to avoid breaking the turf, then drills three and a half feet in rows, dropping one kernel at eight inches in a row together with ashes and plaster; and then rolls the whole field.

As soon as the corn is up, he passes through with the one horse cultivator, continues to cultivate until the middle of June,—product usually 50 bushels per acre. Usually plants one acre of potatoes in the same lot. One potato

in each hill, split; plant as early as possible,—product light, owing to prevalent disease.

Barley follows corn. He drills in two and a half bushels per acre, in April if possible, ploughing in the spring—product from 25 to 50 bushels per acre. Oats are also sown after corn, three bushels seed, product 75 bushels per acre.

Wheat is sown after barley, two bushels per acre, drilled in the first September. Plows the stubble eight to ten inches deep, with double plough, in two rod lands; harrows fine immediately before sowing, product from 25 to 35 bushels per acre. Seeds down to clover and timothy in September, soon after sowing, and uses for meadow or pasture till its turn in the rotation, usually three years, when it is taken up as above described.

Mr. O. has been particular in growing and saving seeds for growing. He has improved white Soules wheat, starting it from a handful, and saving the first ripened for seed, so as to shorten the time of maturing from six to eight days, he has made like experiments, with like results, in barley, oats and corn. His grains and roots were all trained up in this way, and he thinks it essential that seeds of all kinds should be saved from the first ripening and largest ears. His profits for 1854 are $754, or $8 87½ per acre for the improved land. His total receipts amount to nearly $2000. His principal attention is given to grain growing, which he makes a profitable business, as these figures show.

A regular account is kept, together with a memorandum of farm matter. Mr. O. says he can state the annual expense of improving his farm, and the income of it, and at the end of the year can strike a balance of debt and credit. We join with him in thinking the practice very much conducive to close observation and careful farming; one which in the end would very much improve our system, as well as better our fortunes. It is little more than guess work to farm without some guide—without some means of knowing what crops pay at the end of the year, and what prove a losing speculation.—*Rural New-Yorker.*

COTTON GINS.

Messrs. Editors:—In a recent number of the *Scientific American*, page 49, in the article "Saw Cotton Gin," your correspondent has fallen into some errors, I think. I have been engaged for the last twenty-five years in manufacturing the saw gin, and in all that time have watched closely the operation of my own machines, and others, on the fiber of cotton, with the view of improvement wherever it could be done. I make this statement for those who may differ with me in regard to the operation of the gin. It is hardly possible to overrate the importance of this machine. The saw gin, as it came from the hand of Whitney, admitted of but few improvements, and though many have been attempted, they have mainly aimed at (and accomplished) the making a fairer article of cotton, but always at the expense of the fiber. In proof of this there is in Georgia a gin which was made in Whitney's time, and under his patent,—it has iron saws, and very coarse teeth, but the cotton ginned by it brings from one to two cents per lb. more than from the best improved gins.

Your correspondent, Mr. Du Bois, is right in saying that no two saws catch the same fiber, but I cannot think he has investigated closely when he decides that the saws never break the cotton. Let Mr. Du Bois examine samples under a magnifying glass, from different gins, and he will change his views; let him examine carefully the fiber or the seed, and he will find but a very little difference in the length, and none quite short. But the best proof that the saw cuts cotton, is Fultz's improved feeder, which he says separates the long from the short cotton, thus making two qualities, the long being delivered at the end where it enters, and the short at the other, showing conclusively that the cotton which is first taken from the seed is but little cut, while that which runs the gauntlet of fifty saws, comes out a low quality. I have no hesitation in saying that there is no machine which approaches to a saw that can clean the upland cotton without injury to the fiber, to say nothing of the Sea-Island cotton, which has a much finer and more tender fiber; indeed, the only perfect operation in ginning cotton is the roller principle; therefore, whoever will invent a roller gin that can compete in speed with the saw gin, will increase the value of the upland crop ten per cent., or ten millions of dollars annually, to say nothing of the advantage to the inventor.—H. Clark, in *Scientific American*.

New-Port, Fla., Dec. 4th, 1855.

FOR THE PLOUGH, THE LOOM AND THE ANVIL.

CORN CROP IN TENNESSEE—EFFECT OF DROUGHT.

A beneficent Providence has awarded to Eastern Tennessee one of the most abundant crops of Indian corn, just now gathered, probably ever known to have been made in the district. Your readers will remember the complaints made in your journal of the drought in 1854 and '5. The *anomalous drought*, so-called, and indeed the continuous dry weather did seem out of rule. It was truly disastrous to grasses. Root crops and vegetation generally seemed to suffer; but the fall of 1854 being one so dry and so favorable for field work, our farmers ploughed up their fallows early in the fall for spring planting, which by the freezes of winter were mellowed into a light mould. The corn was early planted, the weather favorable, and it grew rapidly off, stood well, and the drought had, it seemed, the balancing property to restrain the too rapid growth of the vegetable part, but kept it in equilibrio, so that the cereal should be bountifully supplied with growing matter. Farmers had observed that too much stalk and blade is not best for a good ear, and this drought may have had a good rather than a bad effect in the growing of the corn crop of 1855. One thing I am quite certain of—that the drought has mellowed and pulverized our soils, and consequently enriched them. For example, allow me to state for the eye of my farming friends elsewhere, that I had an old meadow piece of land which I thought had become so poor it would not bring grass, having in 1841 tried in corn, without raising scarcely enough to fill a bushel sack to the acre. In September, 1854, I ploughed it up, and again in April, 1855, and planted in corn the distance four feet each way, with two stalks in the hill, and which was ploughed over only three times and laid by. The yield from six acres

of this old, poor, worn-out field was not less than sixty bushels to the acre, besides about thirty-four horse loads of the best of pumpkins, planted intermixed with the corn; and I believe, from the appearance of the soil now, it will bring me as good a crop at any such year hereafter, the whole resuscitation of my old field being attributable to the drought, and the facilities for out-door work it afforded. This old meadow field is imbedded on a stiff clay subsoil, no doubt at all former times full of water. The evaporation from the surface by the rays of the sun created a vacuum of water in the soil, which drew its proper moisture from the probable strata of water in the subsoil. This circulation of water in the earth is the reverse of that which takes place in wet weather. It cannot, however, be the water only which is thus drawn to the soil by the sun, which gives life and vigor to the crop, but also all those enriching substances contained in solution. These qualities are often salts of lime, magnesia of potash, soda, &c., and, indeed, whatever the particular subsoil or under-strata of earth may contain. Professor Higgins, State Agricultural Chemist of Maryland, on this subject says:

"The water in leaving the surface of the soil is evaporated, and leaves behind the mineral salts, which I will here enumerate, viz.; lime, as air-slacked lime, or bone-earth, sulphate of lime or plaster of Paris; carbonate of potash and soda, with silicate of potash and soda; and also chloride of sodium, or common salt—all indispensable to the growth and production of plants which are used for food." Which proves conclusively the beneficial results of drought, and indeed our own observation must teach us that the general abundant crop of 1855 could not of right be attributable to frequent showers. Thus the mystery may be somewhat solved. Farmers are sometimes known to complain of the weather, but a Divine benignity always overlooks and orders all things for their good as a final result. A. L. B.

Mill Bend, Tenn., Jan. 4, 1856.

COMPARATIVE VALUE OF CROPS.

[In our January number, page 410, we published the statements of Mr. Harvey as to the cost of sundry crops. In the second crop described, there was a discrepancy in the figures, which on discovery he corrected in the following letter, which was not received till after that sheet was printed. This correction was made as follows.—Ed. P. L. & A.]

Epping, Dec. 17, 1855.

Dear Sir:—Yours of the 16th is duly received. I made a mistake in the first draft in relation to the statement of that wheat, and did not include the interest on land, or taxes. It should read thus:

Whole expense of cash, interest, etc., - -	$12 50
12 bush. wheat at 13s. 6d. - - - - -	27 00
Profit to land - - - - -	$14 50

Potatoes, No. 2. Three years ago I received a few from Andover, Mass., with the assurance that they would not rot. I had but little faith in the statement, but for these three years they have been entirely sound when

others have rotted. They are a late potato, and remain hard for a *year*. They are not of the first quality for the table, as yet. We put them on this piece of land on purpose to try them, to see if they would rot with high manuring and a moist, dark-colored soil. Yours, etc.,

M. P. PARISH, Esq. D. L. HARVEY.

THE SWEET AND THE IRISH POTATO.

SWEET POTATO—BATATUS EDULIS.—The esteem in which the sweet po tato is held may be estimated by the extent to which it is produced, 4,742,000 bushels, worth more than two millions and a quarter of dollars, being the crop of Mississippi of 1840.

In the production of this esculent, Mississippi ranks fourth among the States of the Union; Georgia, North Carolina, and Alabama only excelling her.

Five varieties are cultivated with us, which will be mentioned in the order of their excellence, as generally estimated. First in quality, as in extent of cultivation, stands the Yam, which, if surpassed by some in average size, is approached by but one in delicacy of flavor. Its shape is oval or roundish, with a smooth exterior and yellowish tint. It is as prolific as any other, and keeps remarkably well.

The next in place is the Spanish, or white potato; it is long and crooked, with large veins or nerves running lengthwise on the exterior, by which it is universally characterized. Another characteristic which distinguishes it from all others, is an aptitude of the flesh, or meat, if I may so designate it, when cooked, to divide or separate in layers or flakes lengthwise, the fiber at the same time being destitute of any stringy property.

Early in the season it is rather too milky to suit the taste of many, but when thoroughly cured, it becomes very sweet and rich, differing somewhat in flavor from the yam. It grows to a large size, and singularly enough, notwithstanding its excellence, it seems to be greatly neglected of late, and is not now often met with.

The Bermuda potato has a deep crimson or purple skin; but the interior is very white. In form it is more cylindrical than the yam, somewhat elongated, and is regarded by some as the largest and most prolific variety. Its flavor, however, is coarse and flat.

The Red is the earliest variety introduced here. It was formorly very generally cultivated; it is inferior to the foregoing in size, and not now very much in use.

It is rather dry and mealy, and is best early in the season, when newly dug, and it is perhaps the earliest to mature.

The Poplar Root, which somewhat resembles the yam in outward appearance, but not generally so round, with a smooth skin, and the color rather a deeper yellow, was introduced ten or fifteen years since with high commendations. It proved a watery, insipid kind, however, and is now generally banished.

Up to the period of 1810 or 1815, the yam potato was rarely seen; the old red and white Spanish being altogether cultivated—the former much the more extensively.

The Bermuda is the most recent introduction.

All the varieties of the sweet potato succeed best in a loose sandy soil, although the yam is said to flourish in the prairies of the eastern counties. I have seen one of that variety raised near Macon, which weighed ten pounds.

The proper time for planting is about the 1st of April, and the most approved mode of raising the yam is to *spread* the small roots or potato plantings on a rich bed about the first of March, covering them with three or four inches of loose rich soil. When the sprouts make their appearance above the surface, they are drawn and set out in newly-made ridges after or during a rain.

These beds continue to throw out a succession of sprouts, which may be planted every favorable season as late as the first of August, and if well worked, and the weather be not too dry, will make good potatoes. It is said the red potato does not succeed so well when planted in this way.

At some seasons the sweet potato is sufficiently matured for early use by the first of September; but it is attended with great waste to commence on them so soon, as it is thought the tubers grow more in October after the vine begins to decline than before.

The best time for digging potatoes is the first good dry mild weather succeeding the first frost that kills the vines. They are then better *ripened*, freer from water or sap, and consequently keep better. They should not be suffered to remain undug until the ground freezes, as they will become frost-bitten and rot.

The most approved mode of preserving the sweet potato is to place them in piles or heaps of about twenty-five bushels each, on raised ground, with a flooring of corn-stalks and straw, the sides being lined with the same material, the whole covered with three or four inches of earth or sod, a small aperture being left near the apex of the cone for the escape of the moisture which passes off from the potato when undergoing the sweat, which always takes place soon after they are placed in bulk.

Put up properly in this way they will keep perfectly sound and sweet until June or even later.

The potato *patch* affords a good gleaning to the fattening hogs, which are usually turned upon it, and find in the small tubers, cut and waste potatoes, a favorite food on which they thrive rapidly, and is a good preparation for after feeding on corn in the close pen.

Some planters put in a large crop of sweet potatoes for this purpose, and when corn is scarce give no other food. The meat is said, however, to be less firm, and the lard more oily than that of the corn-fattened hog.

The Irish Potato.—Solanum Tuberosum.—The Irish potato is not extensively cultivated, and seldom beyond the limits of the garden.

Two varieties—the Mechanic and the Purple Eye—are those which seem to be the most approved, the red being rarely planted, under the common belief that the white varieties succeed the best. For what we do plant we are dependent every year almost entirely on those brought down the Mississippi from the Western States.

A course embracing the planting, cultivation, and after treatment, which has been tested many years, may be confidently recommended as one attended with much success.

In suitable weather soon after the first of January, on the even, clean, but unbroken *surface* of the ground appropriated for the purpose, place the cuttings with the eye upwards, three inches apart, in rows two feet distant from each other. Cover *well* with light rich vegetable compost. Well-rotted corn-

blades, straw, or leaves from the woods, are well suited for this purpose. Draw over this a moderate ridge of earth. As soon as the tops show themselves generally above the surface an inch or two high, ridge up with earth, again covering the top entirely, and repeat this in ten days or so, when the tops appear the second time. This will give a ridge of sufficient size, and *completes* the cultivation.

About the middle of April the potatoes are fit for use, and are to be dug daily as required.

About the first of June, especially if the season be dry, the tops begin to fail and gradually die; the grass and weeds which spring up between the rows must not afterwards by any means be removed; otherwise, when deprived of the shade afforded by the top, the potato will become partially scorched or baked in the ground by the intense summer heat, which makes them watery and causes them to rot. Protected by the grass and weeds, they remain fresh and sound, and will keep in excellent condition until frost.

It is generally conceded that the Irish potato cannot in our climate be kept through the summer out of the ground. For this reason, and possessing no value for stock, together with the preference which most Southerners give to the sweet potato, it is not more cultivated.

The crop of 1849 was about 260,000 bushels.

There is a considerable consumption of the Irish potato in our cities and towns convenient to the river, which are obtained from the Western States at a price much below what they can be produced for here.—*Wailes' Agricultural Report of Mississippi.*

REMARKS ON FOUNDER, AND THE FOOT OF HORSES AND SHOEING.

PREFACED BY SOME OBSERVATIONS ON THE REPRINT OF STEWART'S TREATISE ON STABLE ECONOMY.

BY CAPTAIN RALSTON, GRAD. ROYL. VET. COLLEGE, AND MEMB. ROYL. COL. VET. SURGEONS, ETC.

It is gratifying to note the reïssue of this treatise of Professor Stewart, for it is a very useful veterinary text-book, either for horse owners or amateurs, grooms or stable helpers. It little boots to be hypercritical on hypercriticism, and the writer is not disposed either to much carp or cavil at the matter or manner of its American editor's adaptations, or those additions he has made to this adoption from British veterinary literature. The additions, however, are but meagre, and add little that is new; and, as to improved adaptations, the book must speak for itself. One or two of the comments, or notes, are calculated to perplex, as for instance where "Founder" is spoken of. The note appended, here, denies the author's professional view, establishes nothing in its room, and is expressed in somewhat oracular phrase. On the subject of "Founder" the writer proposes to submit a few remarks, the result of no inconsiderable experience; but, first, he wishes to premise a few general reflections, farther, upon this reprint of "Stable Economy."

With all respect for the intelligent zeal of the gentleman who has edited

this American reprint, the writer ventures to think that the book was one which could very well have stood alone, on its original merits; and this so much the more, inasmuch as additions to and emendations of a professional treatise would ordinarily require to come from professional hands. It is true the subject is "Stable Economy"; but the teaching of this had been based on and derived from trained and experienced attainments in veterinary science. Again, the animadversions of the preface, upon Professor Stewart's lack of chemical knowledge, could have been spared. This question in no way was involved; and, moreover, any inferences of chemistry, throughout the volume, have been made in a popular or practical vein. The editor is perhaps a profound chemist, and, still, it may be no lees true that chemical research sometimes refines in its conclusions too far. As this gentleman has predicated, "sugar" is abundant of "carbon," and deficient of "nitrogen," and nitrogenous aliment seems to be denoted for forming muscle. But this elementary question was hardly germane to the experiment with sugar referred to by Prof. Stewart; and more, it would be difficult to gainsay the fact that the negroes on Southern plantations are found to thrive most, and to prove most vigorous, during the period of their hardest labor, at the harvesting and boiling of the sugar crop. In raising and feeding stock, likewise, the value of sugar, as an article of food, has become well and economically known to agriculturists. Still, it is not intended, nor can this rebut the more accurate chemistry of the editor; only, sometimes, one is inclined to exclaim of animadversions, "Here is too little bread to all this sack!" However, the wish to be acknowledged to *know* besets us all; and let us only tell what we really know, and no more than we do know, and we shall instruct and benefit each other. Violations of this rule have been the fertile parents of no end of errors, equally in science and fact.

Those opportunities of practical information relating to horses and stable economy, by which the editor appears to have so well availed, merit every respectful consideration; yet it is all a long way off from attaining to be the veterinarian. Neither natural talent, however aided by general education, nor the best and shrewdest observation of fact and incident, or of daily intercourse with horses, can confer veterinary knowledge, though assuredly yielding valuable adjunctives. If the theory of any science must be of uncertain value, until tested by application or practice, equally and more so are practices halt and blind—unreliable—until cognate of and grafted on due and proper theory. Only combined principles and practices, each in harmony with the other, can fix laws and establish confidence, in a manner to found a claim to be installed in the temple of science. Any one may take up and foster crude opinions, or follow up certain practices, and plausibly term these medical or surgical; but whether this be in relation to man or horses, it is far more than likely that both opinions and practices may come under a similar category, and the one be erroneous, while the other is hurtful. To become a veterinarian, and entitled to decide on veterinary facts and exigencies, demands a studious and systematised acquaintance with those laws and influences that regulate animal life and structure, and well discriminated investigation of healthy and morbid conditions. A French axiom may not be inapt, and is certainly expressive: "Qui dit Docteur, ne dit pas un homme Docte, mais un homme qui devroit etre Docte," or, "to say doctor, is not always to say a learned man, but who ought always to be a learned man." On an occasion where a young veterinarian was giving evidence in a law case, arising out of lameness of a horse, the opposite evidence was that of an old farrier, erudite in veterinary medicine because he had long shod

horses. The judge having summed up on the side of the veterinarian, the jury found accordingly, and greatly to the amazement of old Vulcan. He vowed the verdict was unfair, was a mistake;—what could that young fellow, bred in a college, know? But he—himself—he knew all about horses; had been about them all his life; was born a horse doctor, for his father had been a horse doctor, and his grandfather a horse doctor before him! Neither judge nor jury, however, had any faith in this heritage of veterinary wisdom.

The editor, in his preface, expresses a strong impression of the difference of management required for horses, in consequence of the difference of climate and food of the two countries. The writer from what he has seen of both countries, is unable to recognize any marked difference. The more perfected care and stable discipline, and the improved shoeing of horses in Britain, would be attended with high advantages if introduced here. As to food, except that the British animal never partakes of Indian corn or fodder, there are small differences otherwise. The greater dryness of the climate is much in favor of the horses of this country. In fact, America is qualified to produce the finest horses of the world; for while her varieties of soil fit her for either raising the heavy draft horse or the fleet courser, from the dryness of atmosphere she is peculiarly adapted for raising the latter. In this respect she possesses those advantages which have mainly conferred on the desert Arab his fine form, compacted tissues, speed, and unrivaled hardihood. What this country now exigently wants is a sufficient supply of the right kind of blood sire horses. The mongrels now supplying in every district the place of pure lineaged, or thorough-bred stud horses,are fast deteriorating those other mixed or general breeds, so invaluable to every nation; and this will soon utterly root out the fine foundations laid by the early introduction of English turf horses. That due attention to obtaining the blood horse, of fine form and undoubted purity of race, is so utterly neglected, is a deplorable reflection. Recurring to importations firstly, and gradually, thereafter, raising a supply of this class of horse, for his especial stud purposes, can alone provide a sure remedy; and farmers' clubs and agricultural associations would act wisely by uniting to import a well selected stud horse, or horses, for their own respective districts. It would be an investment which would pay twenty-fold over the employment of an equal fund in any other direction, and would prove an individual, state, and national boon. The writer would have much satisfaction in aiding any such movement, by his experience, or advising, or coöperating.

In regard to the effects of dryness of climate, there is an attendant drawback to shod or stabled horses, which inattention renders serious. In a horse's so artificial state, the horny covering of the foot—the hoof—is apt to become altogether too dry, hard, and inelastic. This evil is augmented by extreme dryness of atmosphere; and the confinement of that needful, but baneful defense, the shoe, greatly aggravates the mischief. Here it is that plank floors, as being bad conductors of heat, are objectionable. But for this, plank flooring (at least for the stalls,) when judiciously arranged for carrying off the urine, etc., is excellent. And if the hoofs are skillfully prepared for the shoe, and the latter is good in form and properly adjusted, and if, at the same time, proper stable care is resorted to, for the purpose of keeping the horn of the fore-feet cool and supple,—then, neither plank floors, stabled life, nor shoeing, need impair the feet, or produce chronic foot lameness. There are, however, more horses suffering from foot lameness in New-York, than in any other part of the globe among three-fold the same aggre-

gate number of horses. It is chronic foot lameness, and the miserable form and fitting of the shoes, that occasion the terrible falls and injuries to horses, daily seen on Broadway. The Russ pavement is very smooth, but still, sound horses, in proper shoes, will never fall on it in the manner now daily done by hundreds. These allusions to the hoofs and shoes lead to a reference to the editor's objection to hoof-ointments. The judicious use of an eligible kind of an ointment for the hoofs, the writer contends, is serviceable. The best is perhaps equal parts of tar and tallow, melted together, and kept for use in a jar. A thin brushing of this over the soles, bars, frogs, and walls, once a week, and for strong feet twice a week, is recommended. On the other days, the fore-feet should be stopped with pads of tow, kept moist, and a spongeful of water should be frequently squeezed over the hoofs. When a horse is to be taken to be re-shod, the tar dressing should be invariably applied over night, and the shoeing smith can then use his drawing-knife in a proper manner, and prepare the hoofs for the shoes as this ought to be done; that is if this operative, who has so much to do with the best value and utility of every horse at work, be in possession of the right knowledge and skill, but which is indeed a rare event.

I now speak of Founder. It is necessary first to ascertain what may be meant by a term, which is a truly absurd one, derived from the horse-doctoring school. Some speak of chest founder, and some of two kinds of foot founder. The former idea is the product of ignorance, which assumes an effect for a cause. The shrunken state of the pectoral muscles, the wired-in shoulders, and contracted cavity of the front of the thorax or chest, which are supposed to constitute the disease, are all, and in every case, effects from long protracted pain in the fore-feet—chronic foot lameness. A horse suffering from this so universal curse of stabling and shoeing, to wit,, contraction, coffin-joint lameness, navicular-joint disease, etc., ceases to go free in his action, and bend his knees; does not exert his muscular forces, or give them their full and rounded play; and goes near, or toeing the ground, and short in gait in every way. He may not drop at all in his step, unless the feeling is only in one foot, which is not usually the case; and, hence, does not seem lame to the unpractised eye. The consequence of this is, in not a few cases, that the unexerted muscles, outside and inside the shoulders, fall away; the circulation through the lungs being decreased, the expansion of these organs becomes proportionally diminished, and the chest, at the brisket, falls in; and, in time, the fore-quarters altogether acquire that wasted look to which the sapient term "chest founder" has been applied. In this country it is also called "sweeny," an Irish piece of euphony.

By some, again, the contracted hoof, and attendant chronic foot lameness, have been termed founder. But what is more ordinarily so termed is the permanent result of a very acute disease, viz., "fever in the feet," or more properly "laminitis." It was to the altered condition of the feet, which frequently follows an attack of laminitis, that the term founder appears to have been originally used; and when the veterinarian adopts the phrase, it is in this peculiar sense. In the cases indicated, the animal treads with the toe of the hoof turned up; the horn of the sole is flat or pumiced, and resembling in appearance the outside of an oyster shell; and in front of the hoof seems as if caved in. It was to laminitis and its sequelae, founder, that Professor Stewart was adverting, where the editor so curtly differs in opinion. Reference was made to only one phase of laminitis, and its consequences, founder, viz., where the occasion of the fever might have been indiges-

tion of food, and a gorged stomach. This is not a frequent cause; but if inflammatory action is going on in the coats of the stomach, and there is likewise local congestion from the organ being gorged with food, a revulsion of inflammation to the highly vascular laminated structure of the hoofs is, medically speaking, a probable enough result.

Any one acquainted with the anatomy of the foot and the specific disease which occasions its lapse to the peculiar condition designated founder, would readily comprehend the professor's limited remark, as applicable to his then subject; but which was otherwise hurried and loose. It may not be amiss to seize the present opportunity, and present a brief description of the laminated structure of the foot, together with this acute fever to which the same is liable, and its so frequent consequence, founder.

The external surface of the horse's foot, or, as more usually termed, the coffin-bone, is covered with a half muscular half membranous structure, denominated the sensitive or elastic laminae. This presents a series of leaf-like edges, something like the plaits on the surface of some paper lamp-shades, but far more minute and numerous. This structure is very vascular, and it circulates an extraordinary amount of arterial blood. On the inner surface of the horny covering of the foot—the hoof—there is a reverse series of plaits, of a half horny half ligamentous texture, resembling the inner side of a mushroom. These plaits, on the outer or convex surface of the coffin-bone, are interlaced or locked with those lining the inner or concave surface of the hoof; and on this union, or combination, every horse's weight and action is wholly suspended and hinged. There are about five hundred of these elastic plaits or laminae to each foot, and they may be likened to minute coach-springs. From the numerous blood vessels and nervous sensibility of this structure, and the extraordinary tension it is subjected to in long continued exertion, it is very apt to undergo inflammatory attacks. The smallness of hoof of so large an animal renders any greater influx of blood or inflammatory tendency very dangerous in so confined a cavity, and this is much increased by hard and unyielding states of the horn, and the binding of its iron defense, or shoe. Laminitis, or fever of the feet, is a violent inflammatory attack of the laminae; usually of the fore-feet, but sometimes all round. This usually runs an acute course of from twenty to forty hours, terminating either by resolution (cure), suppuration, or death. Suppuration is a very common result. When this ensues, the union between the sensitive laminae and those of the inner surface of the hoof is dissolved, or relaxes, and the coffin-bone being no longer fully suspended, sinks down on the horny sole. If the violence of the fever now abates, and the animal should survive, lymph is effused between the laminated plaits, and they are retained together; but no longer elastic. The coffin-bone remains resting on the horny sole, and the hoof presents all the appearances described above. This is what has been termed Founder.

The causes of laminitis are most usually long-continued exertion, followed by muscular exhaustion, and attended by excessive excitement of the heart and arterial system. As already observed, in reference to affections of the stomach, it is not unfrequently the result of revulsion or translation of inflammatory action from other organs; or what, in medical language, is technically called "metastasis." The writer has seen it supervene from inflammations of the bowels or lungs, and on occasions from influenzal fever, when this has run high, and threatened to center in the lungs. It is a disease which requires instant and the most active treatment.

JOHN C. RALSTON.

INSECTS INJURIOUS TO VEGETATION.

LEPIDOPTERA.

We now come to this, the fourth natural order of insects. It comprises caterpillars, butterflies, moths, etc., and forms a very numerous and destructive agency. No insects do so much injury as catterpillars. They multiply with great rapidity, and are exceedingly voracious. Each female lays from two hundred to five hundred eggs. There are several hundred varieties, and all subsist on vegetable food.

Caterpillars differ greatly in form, but certain characteristics are common to most of them. The name Lepidoptera means scaly wings, and under a magnifier the floury appearance of these membranes appear to be scales like those of fishes. They are more or less cylindrical, with twelve rings, and from ten to sixteen legs. They have a shelly head. The first three pairs of legs are shelly, jointed, and armed with a claw. The other legs are without joints, but furnished at their extremities with minute hooks. They have six small eyes on each side of the head, two short antennæ, and strong jaws or nippers. The insect spins its web through a little conical tube in the middle of the lower lip. The substance of the web is contained in fluid form in two bags within their bodies.

Some caterpillars are solitary in their habits, and others herd together in great numbers. Some live sheltered on the stems of plants, others on the leaves, concealed by webs or by rolling up the leaf; others live in the ground, issuing from it only for food.

Caterpillars change their skins three or four times while they are growing. Previous to their first transformation they cease eating, and spin a cocoon about themselves, or envelop themselves with bits of leaves, grains of earth or of wood. Some suspend themselves by their web, remaining uncovered. Others go through their transformations under ground.

Escaping from this covering they become a pupa or chrysalis, and are apparently without heads or limbs. But traces of a head, antennæ, wings, legs, etc., may be discovered pressed closely to the body. In this state they take no food, and remain perfectly at rest. After a while the chrysalis begins to contract, and is rent, and a head, antennæ and body of a butterfly or moth issue; and ere long the insect acquires strength and power of flight, etc. Their butterfly life is very short. Flitting from flower to flower, they pair, lay their eggs, and become a prey to other insects or die a natural death.

Lepidoptera are arranged in three classes, called butterflies, hawk-moths, and moths. These terms correspond to the genera *Papilio*, *Spinx* and *Phalæna* of Linnæus. The following characteristics distinguish these genera.

The butterfly has thread-like antennæ, knotted at the end; the fore-wings of a part, and all the wings of others are elevated perpendicularly and turned back to back, when at rest. Their legs are sixteen in number, and on the hind-legs are two little spurs. They fly only by day. The wings of the true butterfly are upright when at rest; the *skippers* carry their fore-wings upright, the hind-wings being nearly horizontal when at rest. *Skippers* fly but a short distance at a time, with a jerking motion. They frequent grassy places, low bushes and thickets.

Hawk-moths (Sphinges) have their antennæ thickened in the middle, tapering at each end, and often hooked. The wings are narrow in propor-

tion to their length, having a bunch of hairs on the shoulder of each hind-wing. All the wings are inclined like a roof, when at rest, the upper ones covering the lower. On the hind-legs are two pair of spurs. Some fly by day, most of them in the morning and evening twilight.

The hawk-moth is so called from their habit of hovering in the air while taking their food. They are sometimes called *sphinges*, or sphinxes, from a fancied resemblance to the Egyptian sphinx. They support themselves by their four or six hind-legs, elevate the forepart of the body, and remain in that position for hours. When they reach the winged state, they are sometimes called humming-bird moths, from the noise which they make in flying.

In the moth (phalænæ) the antennæ are neither knobbed at the end nor thickened in the middle, but taper from the base to the extremity, sometimes naked and sometimes feathered on each side. The wings are confined together by bristles and hooks, the first pair covering the hind-wings, and sloping when at rest. Two pairs of spurs are attached to the hind legs. They fly mostly by night. They are sometimes called millers, and include those pests of the house called moths. They vary very much in size, form, color, and structure. The owl-moth expands eleven inches; others are very minute, especially those with gilded wings.

It is impossible even to enumerate the entire list of species of these insects which are found in this country. We must therefore attempt only a concise description of certain insects of peculiar interest, and some of those which infest particular plants; and even this can be done only in a very imperfect manner.

FOR THE PLOUGH, THE LOOM, AND THE ANVIL

OF THE MATERIALS USED IN THE ARTS.

I. FROM THE VEGETABLE KINGDOM.

THERE are various kinds of wood used in the arts, consisting of the woody portion of the trunks of trees, which are formed by layers of a hard substance, strengthened by tubular cells between, for the purpose of conveying the *sap*, which is the life of the tree, through its branches. The outer layers are more open, and consequently they are more perishable than the inner layers, which are harder, and are called the heart-wood.

The bark of the tree is used for tanning leather, for coloring, etc.

OAK is the most valuable for timber, and consists in something like twenty species in the United States and Canada. The live oak of the South (*Quercus Virens*) is prized in ship-building beyond any other timber, for durability and strength. The white oak, (*Quercus alba*,) is used for ship-building also, and for mill work, house frames and machinery where strength is required; for wagons, parts of carriages, ploughs, and various other implements of agriculture. The yellow oak, (*Quercus tinctoria*,) is considered next to the white for durability and strength. The bark of this furnishes the *quercitron* used for coloring. The other kinds of oak—red oak, black oak, gray oak, swamp oak, post oak, and chestnut oak, and various other species, are considered valuable for the arts.

HICKORY.—There are several kinds. The pignut, (*Juglans porcina*) is

considered the best for axe and hammer handles, and all other handles requiring strength, for cogs or teeth for wheels, for wagon and cart-axles, as the grain is close and smooth. The red heart, (*Juglans laciniata*,) the shell bark, (*Juglans squamosa*,) are more open grained; consequently are not so good in the arts, as it decays in the weather very soon.

Ash.—White ash, (*Fraxinus Americana*,) and some other species, are very useful in the arts, the wood being strong and elastic, tough and light, durable and permanent in its dimensions; is commonly used for carriages, wagons, and various kinds of machinery, and of great use for oars, handspikes, blocks, etc., for vessels.

Elm, (*Ulmus Americana*,) is of great value for cart and wagon hubs (naves,) as it is tough and not apt to crack or split.

Wild Cherry, (*Prunus Virginia*,) is of a deep color; is very useful in cabinet work. Being stained with a strong alkali renders it almost as dark as mahogany.

Chestnut, (*Castanea vesca B*,) is a large tree of rapid growth, coarse grained and porous, very liable to warp, easy to split. It is used for light timber, for house-frames, such as stud, rafters, and sometimes for sills of buildings. It is very durable in the weather, is valuable for fences and for posts. It should be set top downwards for posts, as it then lasts much longer. It is also charred for charcoal.

Beech, (*Fagus ferruginea*,) is one of our best kinds of wood. It is very hard and smooth, is used for planes and moulding tools, chisel handles, and various uses where hardness and smoothness is required. It is not very durable in the weather.

Basswood, (*Tilia Americana*,) is a very fine grained wood, soft and light, and flexible. It is used by cabinet makers and carriage makers for pannels, etc., for which its flexibility makes it well suited.

Tulip Tree, (*Liriodendron tulipifera.*) This wood generally goes by the name of *white wood*, and sometimes by the name of *poplar*. It is fine grained and smooth, but not durable in the weather. It is very apt to warp, It is mostly used for furniture and wagon bodies, and frequently for joiner work inside of a house. It paints very handsomely.

Maple.—Rock maple, (*Acer Saccharinum*,) also several other species, are hard, smooth, and compact. It is used for gun-stocks, bedsteads, and various kinds of machinery. The curled maple and birdseye make beautiful furniture by staining it with diluted sulphuric acid and a coating of varnish. It makes excellent fuel when dry. The sap of rock maple boiled down makes sugar.

Birch.—The white birch, (*Betula papyracea*,) is similar to maple, only harder. The Indians make their canoes out of the bark of this tree. The lesser white birch, (*B. populifolia*,) is a tree of but little value, except to make charcoal. The bark of the black birch, (*B. lenta*,) is very aromatic; the wood is very firm and compact, of a dark color, of much value for furniture, for screws, and sometimes for joiners' planes. It is very strong. The yellow birch, (*B. lutea*) is very similar to the black except in color.

Black Walnut, (*Juglans nigra*,) is valuable for many uses. Its heart is very dark, resembling the color of the violet, and is frequently used for furniture and for finishing the inside of churches. It is very durable when exposed to the weather. It is very tenacious, and when perfectly seasoned is not liable to crack and warp.

Hornbeam.—There are several species of trees in the United States, under the names of *peperage*, *sweet gum*, and *horn-beam*. Their wood is very smooth

grained, and very remarkable for the interweaving of the fibers, which renders it almost impossible to split the logs. It is sometimes used for the naves of wheels, hatters' blocks, and implements requiring lateral tenacity.

ESTABAN.

SAXE-GOTHÆA CONSPICUA.

THIS remarkable plant, to which his Royal Highness Prince Albert has been pleased to permit one of his titles to be given, and which will probably rank among the most highly valued of our hardy evergreen trees, is a native of the mountains of Patagonia, where it was found by Mr. William Lobb, forming a beautiful tree 30 feet high. In the nursery of Messrs. Veitch, of Exeter, it has lived in the open air four years without shelter, and has all the appearance of being well adapted to the climate of England. The country in which it grows is, indeed, more stormy and cold than any part of Great Britain, as is shown by the following account of it, given by Mr. Lobb in one of his letters to Messrs. Veitch:

"During my absence I visited a great part of Chiloe, most of the islands in the Archipelago, and the coast of Patagonia for about 140 miles. I went up the Corcobado, Caylin, Alman, Comau, Reloncavi, and other places on the coast, frequently making excursions from the level of the sea to the line of perpetual snow. These bays generally run to the base of the central ridge of the Andes, and the rivers take their rise much further back in the interior. The whole country, from the Andes to the sea, is formed of a succession of ridges of mountains gradually rising from the sea to the central ridge. The whole is thickly wooded from the base to the snow line. Ascending the Andes of Comau, I observed from the water to a considerable elevation the forest is composed of a variety of trees, and a sort of cane so thickly matted together that it formed almost an impenetrable jungle. Further up, among the melting snows, vegetation becomes so much stunted in growth, that the trees, seen below 100 feet high and 8 feet in diameter, only attain the height of 6 inches.

"On reaching the summit no vegetation exists—nothing but scattered barren rocks which appear to rise among the snow, which is 30 feet in depth, and frozen so hard that on walking over it the foot makes but a slight impression.

"To the east, as far as the eye can command, it appears perfectly level. To the south, one sees the central ridge of the Andes stretching along for an immense distance, and covered with perpetual snow. To the west, the whole of the islands, from the Guaytecas to the extent of the Archipelago, is evenly and distinctly to be seen.

"A little below this elevation the scenery is also singular and grand. Rocky precipices stand like perpendicular walls from 200 to 300 feet in height, over which roll the waters from the melting snows, which appear to the eye like lines of silver. Sometimes these waters rush down with such force that rocks of many tons in weight are precipitated from their lofty stations to the depth of 2000 feet. In the forest below everything appears calm and tranquil; scarcely the sound of an animal is heard; sometimes a few butter-

Fig. A. BRANCH OF SAXE-GOTHÆA CONSPICUA.

flies and beetles meet the eye, but not a house or a human being is seen. On the sandy tracts near the river, the lion or puma is frequently to be met with; but this animal is perfectly harmless if not attacked."

It is from this wild and uninhabited country that many of the fine plants raised by Messrs. Veitch were obtained, and among them the *Saxe-Gothæa*,

Podocarpus nubigena, *Fitz-Roya Patagonica*, and *Libocedrus tetragona*. Of these he writes thus:

"The two last (*Fitz-Roya* and *Libocedrus*) I never saw below the snow line. The former inhabits the rocky precipices, and the latter the swampy places between the mountains. The first grows to an enormous size, particularly about the winter snow line, where I have seen trees upwards of 100 feet high, and more than eight feet in diameter. It may be traced from this elevation to the perpetual snows, where it is not more than 4 inches in height. With these grow the Yews (*Saxe-Gothœa* and *Podocarpus nubigena*,) which are beautiful evergreen trees, and, as well as the others, afford excellent timber."

Fig. B. FRUCTIFICATION OF SAXE-GOTHÆA.

Saxe-Gothæa may be described as a genus with the male flowers of a Podocarp, the females of a Dammar, the fruit of a Juniper, the seed of a

Dacrydium, and the habit of a Yew. Its fleshy fruit, composed of consolidated scales, enclosing nut-like seed, and forming what is technically called a Galbulus, places it near Juniperus, from which it more especially differs in not being peltate, nor its fruit composed of a single whorl of perfect scales, and its ovule having two integuments intead of one. In the last respect it approaches Podocarpus, and especially Dacrydium; but the exterior integument of the seed is a ragged abortive membrane, enveloping the base only of the seed, instead of a well-defined cup. In a memorandum in my possession, by Sir William Hooker, I find the distinguished botanist comparing Saxe-Gothæa to a Podocarp with the flowers in a cone—a view which he was probably led to take by the condition of the ovule, and which may be regarded as the most philosophical mode of understanding the nature of this singular genus; to which Nageia may be said to be a slight approach, and which is not distinguishable by habit from a Podocarp.

In its systematic relations Saxe-Gothæa possesses great interest, forming as it does a direct transition from the one-flowered Taxads to the true imbricated Conifers, without, however, breaking down the boundary between those orders, as I understand them, but rather confirming the propriety of limiting the Coniferous orders to those genera which really bear cones instead of single naked seeds. In the language of some naturalists, Saxe-Gothæa would be called an osculant genus between Taxads and Conifers.

The leaves of this plant have altogether the size and general appearance of the English Yew (*Taxas baccata*); but they are glaucous underneath, except the midrib and two narrow stripes within the edges, which are a pale-green. The male flowers consist of spikes appearing at the ends of the branches, in a raceme more or less elongated. These spikes (fig. B, 1) grow from within a few concave acute scales, which form a kind of involucre at the base. Each male is a solitary membraneous anther, with a lanceolate, acuminate, reflexed appendage, and a pair of parallel cells opening longitudinally. The female flowers form a small, roundish, pedunculated, terminal, scaly imbricated cone (fig. B, 3.) The scales are fleshy, firm, lanceolate, and contracted at their base, where they unite into a solid center. All appear to be fertile, and to bear in a niche in the middle, where the contraction is a single inverted ovule (fig. B, 4.) The ovule is globular, with two integuments beyond the nucleus; the outer integument is loose and thin, and wraps round the ovule in such a way that its two edges cannot meet on the underside of the ovule;* the second integument is firm and fleshy; the nucleus is flask-shaped, and protrudes a fungous circular expansion through the foramen. The fruit (fig. B, 5) is formed by the consolidation of the free scales of the cone into a solid fleshy mass of a depressed form and very irregular surface, owing to many of the scales being abortive, and crushed by those whose seeds are able to swell; while the ends of the whole retain their original form somewhat, are free, rather spiny, and constitute so many tough, sharp tubercles. The seed (fig. B, 6) is a pale-brown, shining, ovate, brittle nut, with two very slight elevated lines, and a large irregular hilium;

* Since this was written, Sir W. Hooker has placed in my hands a sketch of the anatomy of the female flowers of Saxe-Gothæa, by Mr. B. Clark, who describes the ovule thus: "Its ovule has the same structure as that of Gnetum, as described by Mr. Griffith, viz.: it has three integuments; the internal protrudes, and forms a sort of stigma, not so obvious as in Gnetum; the external has constantly a fissure on its posterior, or rather inferior surface, which, however, does not close as in Gnetum when the ovule advances in growth, nor yet becomes succulent. Mr. Griffith describes the fissure in the external integument of Gnetum as constantly posterior; and if the ovules of the strobilus were erect, they would agree with Gnetum in this particular."

at the base it is invested with a short, thin, ragged membrane, which is the outer integument to its final condition. The nucleus lies half free in the interior, the fungous apex having shriveled up and disappeared.

Explanation of the Cuts.—A, a branch with male and female flowers, natural size; B, various details of the fructifications, more or less magnified; 1, a spike of male flowers; 2, a male or anther part; 3, a twig and young cone; 4, a scale seen from the inside with the inverted ovule, showing the fungous foramen protruding beyond the primine (outer integument); 5, a ripe fruit; 6, a seed showing the two slight elevations upon the surface, and the remains of the ragged primine at the base.—*Journal London Horticultural Society.*

Machinery and Metals at the Paris Exhibition.—An American ironmaster in Paris informs us that the French made a great display of steam-engines, iron planing machines, large tools, marine propellers, etc., and that they were mostly defective—curious, but not like American machinery, which is simple. Some of them were monstrosities. For instance, their fine-finished steam engines were badly proportioned, with a small and large cylinder to do what one would accomplish better than two. Strange to say, their propeller engines are geared, even those used in the 100 gun war-steamers. The same is true of British engines for the same class of vessels. They say that direct action engines have such large journals that the wear of the boxes is too great, and they find it better to gear them. At the same time they admit that there is often a total smash of their cog-wheels.

The show of metals in the Exposition was very extensive. They were wonders in the way of the sizes of masses, bars and sheets of iron. The English seemed to excel here the other Europeans. Yet some French samples were very interesting and nearly equal to the English. I saw bars of railroad iron from 80 to 90 feet long, sheets 30 feet long, 6 feet wide, and half an inch thick. Some of the Prussian works in cast steel were wonderful. One mass weighed 11,000 pounds.

In coals there was no show worthy of an American's attention. The samples were poor and thin. There is no coal in Europe that will compare with ours. There were few ores like our magnetic varieties on exhibition. Ah! if we Americans only appreciated the elements of a national superiority, over all the people of the world, which God has planted in our soil, our climate, deep in our earth, and in our running waters, if we only used them with a wise national economy, how wealthy and how powerful we would be. By-the-by, have I said that neither the English nor the French can, as far as I have observed, teach us anything in the great business of making iron? —*Albany Eve. Jour.*

An Enormous Room.—The largest reading room in the world is now nearly completed, in the British Museum. It is circular, 140 feet in diameter, and 140 feet in height. The tables will accommodate nearly four hundred readers. The wrought iron book-cases will contain 102,000 volumes. The cost of the room will be about $300,000.

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

SCYTHE MAKING.

BY DANIEL JAY SPRAGUE.

However much the advancement of mechanical arts may be indebted to the increase of knowledge which characterizes our age, and to its newly developed skill, invention, and application, it is not much less indebted to the comparatively modern institution of Division of Labor.

Every department of business which calls forth human industry, whether mechanical or professional, is subject to this improvement. We do not expect to see the same person officiating both in the capacity of clergyman and lawyer, or astronomer and geologist, philosopher and mechanic, no more in the mechanical than in the mental world, should a single individual be expected to fulfill the duties of all departments. One studies the laws of mechanics, another the application; one forms the surgeon's knife, another puts the same in use.

This is so common and so much in accordance with ones own sense of propriety and economy, that we do not observe in these arrangements of professions, studies, and employments, a division of labor. Yet its existence is none the less true.

The field of knowledge is so rich and boundless that we should esteem a man beside himself did he think to make any profession especially his own and yet to become an adept in every other. Life is too short and art too long for man to make himself master of all the avenues of knowledge. Did he consider this a necessary preparation for the duties of life, he would find his three score years and ten to have passed away long before he was fitted for the arena of action.

I knew of a gentleman who had graduated at two American colleges, and had for several years studied botany in this and foreign countries; yet, notwithstanding he was one of the first scholars of the age, said he did not consider himself competent to take the entire professorship of a single species of bulbous plants.

By division of labor the time which is lost in learning an entire department of manufacture is lessened, and the amount of productive labor which a man in his life may effect much increased.

Division of labor advances the quality of that which is produced, since continued attention to one department gives greater perfection in that department. It also, by confining ones attention to a single portion of manufacture, leads to new inventions to shorten the process, and save time, labor, and expense.

As in philosophical investigations, if one individual gives his whole mind and attention for years to a single department he attains a greater degree of knowledge, delves to a deeper, profounder depth, and brings from the more obscure veins richer thoughts than he who but skims the surface, or turns his mind now to this and now to that study; so in mechanics let a person give his attention to one operation, and he will not only perform that more perfectly, but will also suggest some method to shorten the time, or some invention by which machines shall perform the labor of the hands, and thus, perhaps, will open a new field of employment to other individuals. The adoption of the principles of division of labor has been for years past con-

tinually on the increase. The pin, the needle, the lock, and the loom, though formerly each was produced by the labor of a single individual, must now pass through its score or more hands before they are finished and prepared for use.

Thus, by an instrumentality which at first thought may appear comparatively trivial, great results in the mechanical arts are with ease acccomplished, and each new invention or operation becomes a fresh testimonial that ours is an age of progress.

I have been led to these remarks on division of labor by recently noticing a practical application of the principles to the manufacture of scythes, by A. V. Blanchard, of Palmer, Mass. A partial description of the manufactory I will attempt to give:

The first process in scythe making is called the welding process; it consists of two pieces of steel, each of which is about three-fourths of an inch wide and three inches long, the one of cast-steel, for the back, to stiffen and give strength; the other of German steel for the edge. These are placed side by side, and folded in a piece of iron six inches in length and two in width; thus making the metal which constitutes one scythe to be a mass about three inches in length, two in width, and one and a half thick, weighing less than a pound.

Since a mass of these dimensions would be inconvenient and almost impossible to shape under the trip-hammer, which is the only kind used in forging the scythe, it is not cut from the bar of iron in which the steel is folded till it has first been drawn to about two feet in length, and is then in such a shape as can be conveniently handled.

This little rod of iron and steel is then passed in an exceedingly rough state to a second class of hands called the jointers. It is their duty to smooth it in a degree from the indentations of the first process under a lighter hammer and draw to about three feet in length, leaving the whole thickness equal to the back of the instrument when finished.

By the folding of the steel in the iron a twofold advantage is gained, viz., the steel and iron are more readily incorporated in one mass, and the steel is brought into the center of the scythe where it is needed, having the iron on both sides to give it shape and strength. Thus along the edge of the whole rod may be distinctly seen, by the difference of the metal, the steel inclosed by the iron. The upper corner of the rod is then cut off, making it slightly pointed, when it is ready for the third process called plaiting. This consists in drawing to a proper thinness the web, as it is called, which includes all except the back, and in shaping the back giving to it the form and curvature of the instrument, first suggestive of what is being constructed.

There must here be exercised no little skill to properly reduce the thickness of the metal and yet preserve the just relations throughout, since it might easily be distorted so that the steel would be almost entirely exposed, or separated from the iron, and consequently one part of the instrument might cut well and another part possess little of the cutting qualities.

When a proper thinness is attained the fitters curve the blade, which is the fourth process of manufacture, and it is ready for the next class of hands.

After plaiting and fitting, the back is set up. This is done by a singularly-contrived double hammer. It is so formed that the weightier part of the hammer, having its configurations reciprocal to those of the anvil, as it falls gives the particular inclination desired to the middle portion between the edge and the back, while another part, by the elevation of the first and by the motion of the beam to which the hammer is attached is drawn up, as it

were, against the anvil, and thus turns up the back nearly at a right angle. By this means, from a flat bar of steel, that which seems to be the most difficult part in the construction of the scythe is accomplished by a single blow. This process in the manufacture is called, from the large share which it performs, the *finishing* process, since it nearly finishes the shape of the part between the heel and point. These yet remain straight.

The sixth process consists in finishing the point, twisting it up or down, as needs be, so that it shall be straight with the edge, and also in turning the heel and claw, by which it is fastened to the snath. The name of the manufacturer and the kind of scythe is then stamped on by the action of a single die. The scythe is now forged, and the shape complete.

Several attempts have been made to diminish the amount of labor and shorten the time required for the construction, but as yet none have proved successful. A gentleman is now studying to invent a machine by which these results shall be accomplished. His success or failure remains yet to be demonstrated.

The next process is hardening and tempering. In common usage these words have the same signification, whereas in reality their meaning is quite different. The hardening is effected by heating the scythe to a red heat, and then suddenly cooling by dropping into water. This makes the metal extremely hard and brittle. It is like glass, which, though much harder than our cutlery, has notwithstanding little of the cutting qualities. Therefore were they prepared for use in this condition, they would be of little value. They must be tempered, or, as the word itself denotes, *toughened*, so that the edge will not so easily break out.

After hardening, and before tempering, I noticed that the workman pounded the edge and broke from each scythe a small piece near the heel and point. The object of this, he said, was to see the steel and examine its quality. I learned also that the fineness of all steel depends not alone on the ore of which it was made, but upon the hammering and proper working of the metal. A good workman may obtain from poor ore as good and perhaps better metal than a poor workman can from the very best.

In manufacturing well-wrought steel, it is first heated to what is called white heat, and then hammered till cold. It is then heated a little more than red, and hammered till cold. Afterward it is heated again to a still lower degree, a cherry red or pink heat, and then hammered as before till cold; the number of different heats and hammerings giving to the metal its finer or coarser quality. Thus, thought I, not unfrequently is it with mankind—the best metal is that which has been the most pounded.

The process of hardening may be performed at any time, and requires comparatively but little skill; but tempering requires not only a good degree of knowledge of the art, for such it may be styled, but also much skill and experience, and is best accomplished in the night-time or in a dark room. Scythes are tempered by drawing them back and forth over a hot fire till the steel assumes a certain reddish tinge, readily discerned by the workman, though it cannot be easily described. They are then permitted gradually to cool, which fixes the temper a little lower than when first taken from the fire. The hardening process leaves the temper too high; the second heating draws down or lowers it.

Color is not the only test of temper, but it may be ascertained in many other ways. Sometimes they are heated to such a degree that when spit upon it will roll off like oil, without noise; or, when a drop of water is let fall upon it, there will be given a peculiar snapping sound. Another method

is to heat to such a degree that oil, when poured on them, will just blaze. There are several other different modes, each perhaps peculiar to each mechanic.

The Damascus sword-blades, which have a world-wide celebrity for their temper or toughness, were tempered by heating them to a cherry red heat, and then were taken into the open air and swung around till cold. The quality of the steel, however, was also superior to that of the present day. It is related that the method in which this peculiar temper was first learned was, like very many other discoveries, entirely by accident.

An old commander, who had lost his sword in battle, went to the manufacturer, and in great haste ordered another to be immediately made. It was no sooner forged than he seized it, while yet hot, and mounting his steed, continually flourished the sword over his head till cold. It was afterwards found to possess a temper superior to any before made, and consequently suggested this mode of tempering, which subsequently became of very general use throughout that country.

There are many different kinds of temper, each tool requiring one of its own. To razors and surgical instruments is given the highest, to the axe and chisel a lower, and to springs the lowest. Scythes require a temper nearly as high as that of a razor, but the quality of the steel is inferior; consequently to obtain an even temper through the entire length of so long a cutting instrument is a labor demanding much care, and workmen of superior skill. Scythes also need a different edge from that of a razor. To the latter is given as smooth an edge as possible, while to the former is given a rough edge somewhat like that of a sickle. A fine smooth edge is not suitable for a scythe, since it soon becomes so gummed by the juices from the grass that it cannot cut. It is, however, requisite for all the finer cutlery, and for this reason, together with the fact that they contain but little metal, and are liable to become distorted if thrown into water, some are both hardened and tempered in oil.

A proper temper effects the ease and smoothness with which an instrument cuts. There are two cutting utensils, says the farmer, of which I wish the best quality, namely, a scythe and a razor, for to use a poor one of either kind well-nigh takes a man's life. The one draws the sweat, and the other draws the tears.

After the shaping and tempering of the scythe is finished, the next operation is to grind them. Each scythe is ground three times. They are first rough ground, as the workman terms it, which consists in bringing them to an edge; next they are ground across the edge, the object of which is to straighten it; lastly they are smooth ground, which exposes the steel about a quarter of an inch in width, the entire length of the instrument, and leaves them nearly to an edge, but not sharp enough to cut with careful handling. How many times, when a boy, have we sweated over the little rickety grindstone, and wished scythes might be bought at the stores sharp as razors. Often, too, have we looked at this exposed portion of the steel and remarked how large a proportion of the scythe was nothing but iron, then we moralized for a time on the deceitfulness of mankind, and finally summed up our little-satisfactory discourse with the not altogether pleasing inference that there were cheats in all trades but ours.

After grinding, the scythes are rinsed in lime-water to prevent rusting before they are finished. The stones used in grinding are of immense size, weighing from forty to fifty thousand pounds, and require six or eight men to hang them. When new, the stones just coming from the quarry are ex-

ceedingly rough, and therefore are turned off till smooth, after which the edge is filled with grooves about an eighth of an inch deep, crossing each other in every direction, the object of which is to make them wear away the steel more rapidly. When in use, these stones make nearly one hundred and eighty revolutions a minute. They are put in motion and brought to rest very gradually, since from the weight to be moved and the great momentum they acquire, there is danger of bursting. The strength of new stones is tested before they are used by putting them in rapid motion and leaving them for several hours.

With the greatest care and best regulations, stone will sometimes burst and fatal results follow, though the occurrence is by no means as frequent as formerly. This doubtless results in some degree from the exercise of greater care, also from the use of green instead of dry timber in fastening them to the axis, and improvements in the mode of fastening.

The grinding is the most unhealthy part of the manufactory of scythes. It is unhealthy because minute particles, worn from the stones and the steel, are thrown off into the air, which in the vicinity of the operator becomes saturated, as it were, with it, and in breathing they are inhaled and deposited upon the lungs. These particles are deposited so rapidly that it is estimated a man who constantly follows the business would not live more than from four to seven years. Indeed in some sections there is a disease which is called the grind-stone consumption. On the lungs of persons who have died of this disease have been found pieces of grit from the stones as large as a walnut. Many means have been tried, by applying bandages to the mouth and nostrils, and otherwise, to prevent the ingress of these particles, but with little advantage.

In grinding a man is required to have his whole weight upon the scythe, and it is thus liable to become twisted; therefore they are next examined and straightened, after which they are ready for the subsequent process of polishing.

This is done with the common emery-wheel, which is a wooden wheel prepared for the purpose by spreading upon it a coating of glue which is thickened with emery—a dark colored sand—and made to revolve at the rate of two thousand revolutions a minute.

Emery is one of the varieties of corundum, obtained for the most part from Europe, though an inferior quality has been obtained from our own country. It is found in Saxony, in a mountain called Ochsenkopf, near Schneeberg, and also in the islands of the Greek Archipelago.

After polishing, the scythes are painted or oiled, to prevent rusting, put up in dozen bundles, wrapped first in paper and then in straw and are prepared for market.

In this manufactory are annually produced about two thousand dozen of scythes, making use of about thirty tons of iron and one of steel. This iron is all obtained from Norway or Russia, it being thought superior to the American article.

For a time the Salisbury, Conn., iron was used, and considered equal to the imported, but in later years it has become inferior by the mixture of other ore. It is much to be regretted that, while the mines of the United States contain an abundance of superior ore our citizens should be compelled to patronize that of foreign countries, simply because of the frauds and deceits of money-catching producers at home.

In this establishment is annually consumed in carrying on its operations nearly ten thousand bushels of charcoal and fifty tons of anthracite coal

The wind for the five or six forges is supplied through a pipe little more than two inches in diameter, by a simple blow-wheel of only twenty inches driven by water so as to make sixteen hundred revolutions in a minute. Employment is here furnished to fifteen or twenty men, each of whom is paid by the dozen for the amount of labor performed. The welders, platers, and temperers each receive twenty-five cents a dozen, and can finish ten dozen a day, making their daily wages two dollars and a half. The grinders receive the same wages per dozen, but usually cannot finish so large a number as those in other departments.

Upon the whole the receipts of these workmen are even better than those of not a few professional men, and the inducements presented to the mechanic in our country are in a sense superior to those of the scholar. I have drawn at some length, this sketch, illustrative of the principles of division of labor and their application, believing that the time thus spent in the study of the practical to be of infinitely more value than that of mere abstract theories.

It is one thing to know that an article *is* produced and fitly prepared for use, but quite another to know *how* it was produced and rendered thus perfect. Of the latter kind of knowledge our world has far more need than the former.

NEW BUILDING BRICKS.

A PATENT has been secured by Mr. Edgar Conkling, of Cincinnati, Ohio, for a new form of brick. Several plans have been devised of late for securing strength to brick structures. Bricks of the ordinary form have, of necessity, a considerable space between them, filled by mortar, and yet exposed to the weather, and severely acted upon by rains and frosts. These bricks are so constructed, with apertures in the interior of the wall, though upon the surface of the brick, that the mortar is thoroughly defended from the force of storms, while it also gives an increased strength to the wall in resisting lateral

Fig. 1

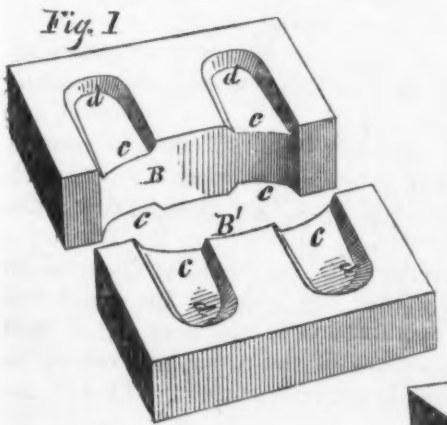


Fig. 2

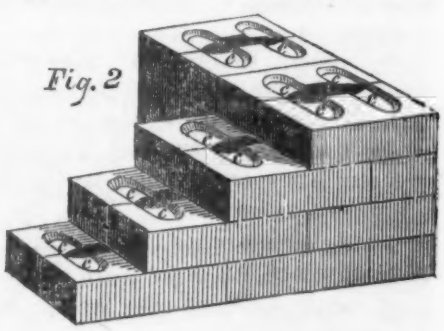
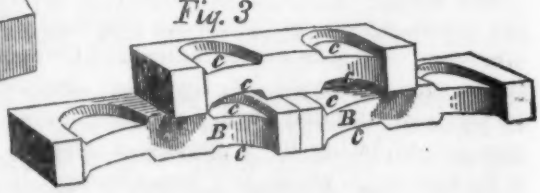


Fig. 3



pressure. The wall thus built is perfectly solid, while the bricks are laid close to each other, and yet are firmly bound together by a sufficient quantity of mortar. Models of these bricks may be seen at this office.

In the annexed engravings, fig. 1 shows the form of the improved bricks separately; fig. 2 exhibits their appearance when laid in a wall; fig. 3 is a section of wall.

The inner edges of these bricks, B, are made a little concave. The surfaces are formed with cavities, *c*, the back parts of which are the deepest as at *d*. With these exceptions the surfaces are made flat in the usual manner, and come in contact like ordinary bricks. In laying a wall the top surface of each course is to be washed over, by means of a white-wash brush, with a thin coat of grouting or cement, or covered with a thin stratum of slush mortar. Grouting is then poured into the interstices, which in consequence of the openings formed by the cavities in the brick, has abundant opportunity to circulate among them, and forms the strongest kind of binding. In putting up house fronts, no pointing is required to be done, and no discoloration of the surface is occasioned. No more time is required in laying these bricks than the ordinary form, as Mr. Conkling informs us, while there may be a saving in the mortar. These bricks make a strong wall. It is conceded by some masons that a 12 inch grouted wall is equal to one of 16 inches mortar laid.

We are told also that there is no difficulty either in the molding, pressing or burning of these improved bricks, and no increase of expense. If the usual care is taken in sorting out from the kilns, the proper proportion of bricks that are sufficiently true and even for fronts will generally be found.

We commend this invention to the attention of builders, and shall be happy to aid them in making experiments with them to their satisfaction. We shall probably have more to say of these bricks hereafter.

ENGLISH PATENTS.

An Improved Mode of Preventing the Alteration of Bank Bills from one Denomination to Another.—One of the most common methods of counterfeiting bank notes or bills consists in erasing the figures which indicate the denomination of the note, by rubbing with the hand or otherwise, and reprinting or pasting upon the surface so prepared, other figures indicating a higher denomination. Thus, the word or figure "five" may be erased, and upon the surface which it occupied "fifty" or "one hundred" may be printed. Alterations of this description easily deceive the public, as, when well executed, they can be detected only by the initiated, and upon very close examination. To render this species of alteration impossible, by affording to the initiated a ready means of easily detecting it if practised, is the object of the present invention, which consists, in so imprinting into the body of the paper, the character or words which indicate the denomination of the note or bill, that it can only be erased by the total destruction of the paper, and cannot be replaced or imitated even if it were found possible to erase it. This is accomplished, either by a process analogous to that which is known in the manufacture of paper as "water-lining," or by printing the paper as it is manufactured, with the required characters or figures, by a peculiar process,

which causes the color to penetrate entirely through the body of the bill or note, so that it cannot be removed without destroying the texture of the paper itself.

During the process of manufacturing the paper, and while yet in a soft pulpy state, it is imprinted with characters or letters indicating the denomination of the bill, "five" for a five pound note, "ten" for a ten pound note, and so on, for notes of other denominations. This may be accomplished in various ways, as follows: First, by water-lining in the ordinary way, with wire secured to the vellum, so arranged as to impress the required characters upon the paper; or the same effect may be produced by means of types, slightly raised upon the surface of a cylinder, which is caused to bear upon the web of paper while it is still soft and impressible, and thus indent the required characters into the body of the paper,—the velocity of the surface of the cylinder being exactly equal to that of the web of paper as it passes through the machine. To render the characters thus produced more apparent and striking, they may be imprinted upon the soft pulpy paper in colors, and in such a manner as will insure the color sinking deep into and entirely penetrating the body of the paper. This is readily accomplished by means of a cylinder, similar to that above described, having upon its surface points set close to each other in lines forming the desired figures, and sufficiently elevated to penetrate the paper whilst it is yet in a soft pulpy state. These points are charged with ink of the required color, which is transferred (as the cylinder revolves) to the paper, into the body of which it penetrates. The holes made by the points are instantly closed by the pressure rollers, to which the paper is afterwards subjected, and the coloring is thus caused to penetrate entirely through the note, and consequently cannot be removed for the fraudulent purpose before mentioned.

NEW MODE OF SEPARATING CERTAIN VEGETABLE FIBRES FROM MIXED FABRICS FOR VARIOUS USEFUL PURPOSES.—This invention, which has reference to the treatment of fabrics composed partly of animal and partly of vegetable fibres, as, for example, any fabrics containing woolen or silken filaments in connection with flax or cotton, has for its object to utilize the refuse of such fabrics, by separating the vegetable fibre therefrom in such manner that either the vegetable fibre or the animal fibre may be obtained in an integral or solid state, or a state of solution; or the nitrogen of the animal fibre may be evolved for any manufacturing purposes for which the fibres or nitrogen respectively have hitherto been or may be found serviceable. To this end the patentee avails himself of the properties of caustic alkalis and alkaline earths, on the one hand, for decomposing the animal matter in the fabrics without affecting the vegetable fibre, and of the property of acids, on the other hand, with which, by the assistance of heat, a disorganization of the vegetable, without injury to the animal fibre, is affected.

To separate the vegetable fibre, in an integral condition, from the mixed fabrics, by dissolving the animal matter, the fabric is simply boiled for a sufficient time in a solution of caustic alkali or alkaline earth; soda or lime is preferred for this purpose; but any other alkali or alkaline earth may be substituted with efficacy.

To separate the nitrogen of the animal fibre in the fabrics in a form available for manufacturing purposes, the material to be operated upon is placed in a close vessel of the kind ordinarily used in the manufacture of ammonia, together with such a quantity of alkali or alkaline earth as may be found sufficient to effect the decomposition of the animal matter. Heat is then

applied to the mixture in any convenient manner, but preferably by passing steam, at a high pressure, through the whole mass of fabrics; and the ammoniacal vapor which is evolved by this process is condensed by passing it into an acid, and thus forming a sort of ammonia; or by passing it into water, and thus forming an ammoniacal liquor, from which the nitrogen may be readily separated.

In order to separate the animal matter from the fabrics in the form of a solid, the materials to be operated upon are placed, together with the alkali or alkaline earth, in an open vessel, and heated to about 180° Fahr. The resulting liquor is drawn off and treated with a stream of carbonic acid, or with a sufficient quantity of any other acid, to neutralize the alkali or alkaline earth. By the above process, the animal matter contained in the fabrics will be precipitated in the form of a fine powder, which may be collected in a filter and dried for use. The quantities of alkalis or alkaline earth necessary to effect the decomposition or solution of wool, will vary with the sample of rags to be operated on, because some rags contain more animal matter than others: but when the ordinary stuff-goods are employed, it may be said, in a general way, that from three to four cwts. of soda, or from six to seven cwts. of lime, will be required for the treatment of every ton of goods. When alkalis, in preference to alkaline earths, are employed for the treatment of the mixed fabrics, the said alkalis may be recovered for the purpose of obviating waste, by the process of evaporating the refuse liquor to dryness, and heating the sediment to a red heat, or by boiling the liquors with fat, so as to form the well-known compound soap. When the animal matters in the fabrics are required to be preserved intact, the separation is effected by wetting the material with a solution of an acid—being either a vegetable acid (which the patentee prefers using,) as tartaric or oxalic acid—or a mineral acid, as sulphuric, muriatic, or nitric acid, and heating the wetted mixture in a suitable chamber, by means of a jet of steam, or in any other suitable method, to the temperature of 300° Fahr.; by which process the vegetable fibre will, in a very short time, become disorganized and rotten, so that the animal fibre may readily be separated by any suitable mechanical contrivance; as, for instance, when the said animal fibre is woolen, the wool may be combed out by means of a carding machine, which will refuse the vegetable matter as dust.

Improvements in the Manufacture of Plain and Ornamental woven Fabrics.—This invention consists in constructing plain and ornamental woven fabrics with a warp or weft, or both warp and weft, composed of yarns or threads twisted in contrary directions, that is,—some of such yarns or threads being twisted in one direction, and the others of such yarns or threads in the contrary direction; and in giving to all or some of such yarns or threads more than the usual amount of twist; so that when moisture is applied to the fabrics, the action of such moisture on the yarns, twisted in manner aforesaid, may cause the same to curl, snarl, or shrink, and thereby produce fabrics similar to crape. Except in twisting the yarns or threads in manner aforesaid, they are spun and prepared in the usual way.

In carrying out their invention the patentees prefer to make use of a loom with a drop-box of the ordinary construction. When the weft of the cloth only is intended to consist of threads twisted in contrary directions, a warp made of yarn spun as usual is put into the loom, and two shuttles are required, each containing weft with sufficient twist—so that when moistened the twist shall cause the weft to shrink, snarl, or curl. The weft in one of

the shuttles is twisted to the right hand, and that in the other to the left hand. In weaving such a cloth, it is preferred that two shoots of weft, twisted to the right hand, should be put into the cloth, and then two shoots of the weft twisted to the left hand, and so on alternately until the piece of fabric is completed. When the fabric is taken out of the loom it is in appearance like muslin, or any other plain fabric; but on the application of moisture, the curling or snarling of the weft causes the fabric to shrink or contract in width, and to assume an uneven surface, somewhat similar to that of crape. Modifications in the weaving of such cloth may be adopted according to the quality and the object for which the fabric may be required; thus, the proportions of the yarns or threads twisted in opposite directions may be varied, and three shuttles may be used; one containing ordinary weft yarns or threads, and the other two containing weft yarns or threads twisted in contrary directions, and with more than the usual amount of twist, as above described.

In weaving with three shuttles, the three shuttles may be thrown across the shed in any required succession, for the purpose of producing the desired effect. For instance, two picks may be given with the ordinary weft, then two with the right hand twisted weft, and then two with the left hand twisted weft. The warp of a cloth may also be composed of yarns or threads twisted in contrary directions in any desired proportion—the whole or some of them having more than the usual amount of twist. The weft of such a cloth may be composed of ordinary yarns or threads, and woven in the usual manner; or the weft may be composed of any of the combinations of yarns or threads hereinbefore described.

When fabrics have been woven according to this invention, they may be bleached, dyed, or printed in the ordinary manner, and the uneven surface craping or crimping is then produced by the action of the moisture which is necessarily imparted during either of the said processes; but if the yarns or threads of which the improved fabrics are woven have been previously bleached, dyed, or printed, it is evident that the uneven surface craping or crimping must then be produced by the direct application of moisture.

It may be desirable to stretch or distend the fabric, in order to obtain a plain surface for printing upon, and to keep the fabric stretched or distended until the colors printed upon it are dry. The uneven surface may then be produced by the application of moisture; by which means an ornamental fabric of a chené description is obtained. All or some of the warp or weft threads, or of both the warp and weft threads, may be colored or parti-colored before they are woven. The process of printing may also be performed on the uneven surface of the fabric. Fabrics may be woven, having a loose or floating back, or with black-lashed threads, and a crape face produced in the manner before described. The invention may be used in producing fabrics of cotton, silk, wool, worsted, or other fibrous material, or any combination of any two or more of such materials.

The patentees claim constructing the warp or weft, or both warp and weft, of woven textile fabrics, whether plain or ornamented, of yarns or threads twisted in contrary directions—the whole or part of such yarns or threads having more than the usual amount of twist for the purpose of producing fabrics having craped or crimped surfaces, in the manner described.

AN IMPROVED CONSTRUCTION OF SPURS.—The object of this invention is so to construct spurs as to permit of their being fitted on to boot heels of

various diameters. For this purpose the clasp of the spur is constructed of two arms, which are jointed to a central-threaded stem that carries the rowel of the spur. By the pressure on the inner ends of the arms of a nut or button which works upon the thread on this stem, the span of the arms is contracted, and the firm attachment of the spur to the heel of the boot is effected.

IMPROVEMENTS IN THE TREATMENT OF RAGS AND OTHER GOODS FORMED PARTLY OF WOOL AND PARTLY OF VEGETABLE FIBRES, IN ORDER TO SEPARATE THE VEGETABLE FIBRES FROM THEM, AND OBTAIN THE WOOL IN ITS PURE STATE.—This invention applies to tissues or other fabrics (whether rags or pieces of new goods) composed partly of wool and partly of vegetable fibres, and consists in a mode of removing the vegetable from the woolen fibres, and thereby obtaining this latter in a suitable state for manufacturing purposes; the same, consequently, offers an easy mode for removing the threads from rags with which the seams, button-holes, or other parts have been sewn. The rags or other goods, after the same have been cleaned to a certain extent, by any of the known means, are put into an acid bath (whether cold or suitably heated,) containing one hundred parts (by measure) of water; from four to five parts of common sulphuric acid of commerce; and about one part of alcohol; and in this bath they are left as long as required for disintegrating sufficiently the vegetable fibres. The goods are then removed from the acid bath; after which, the greatest part of the liquid is pressed out, and the goods are dried by any suitable means —care being taken to spread them out as evenly as possible. When dried, they are submitted to a beating engine, or other contrivance, for removing the woolen fibres from the partly-decomposed vegetable fibres that might still adhere to them; after which the wool is to be thoroughly washed in water, or in a weak alkaline or soap bath, in order to deprive it of acid; it is then again dried, and in this state will be ready to be prepared for spinning or other manufacturing purposes.

The patentee claims the mode of submitting tissues or other fabrics composed partly of woolen and partly of vegetable fibres, to a bath of diluted sulphuric acid, to which a small portion of alcohol is added; by the action of which bath, and of the processes above described, the vegetable fibres are readily removed from the wool, and leave this latter in a state fit for being again employed for spinning or other manufacturing purposes.

AN IMPROVED MANUFACTURE OF BEARINGS FOR CARRIAGE AXLES AND SHAFTS OF MACHINERY IN GENERAL.—This invention relates to the manufacture of bearings from leather, to be used in place of brasses and other metallic bearing surfaces; the object being to render the bearing surfaces of blummer blocks and axle-boxes more durable and less costly than heretofore. In carrying out this invention, ox or cow hides are preferred, either tanned, tawed, or otherwise prepared; and for one class of bearing, the hides are cut up into pieces of suitable size for lapping half, or nearly half, round the journals to which they are to be applied. These pieces are compressed in half-round moulds to bring them severally to shape; and the required thickness of bearing is obtained by cementing two, three, or more thicknesses of leather together, piling them in layers one above the other, and then submitting the combined thicknesses of leather to pressure in a suitably-shaped mould for the purpose of solidifying the same. These bearing surfaces may be backed or cased with metal.

IMPROVEMENTS IN THE CONSTRUCTION OF ANCHORS.—This invention consists in forming the shank of the improved anchor of two plates of iron or other metal, kept apart throughout the whole or a portion only of their length, by means of a filling-piece of wood or other suitable material, or by means of suitable enlarged portions of the plates themselves. The shank is united to the arms either by a forelocked pin or pins, or by clinched-bolts or by screw-bolts, according as the arms are intended to be moveable about a center or otherwise. When the filling-piece is used, a metal collar is made to embrace the two plates and the filling-piece, which forms the shank, for the purpose of combining them more effectually at their junction with the arms, which may be made flat and of an uniform thickness, or of any other desired form.

IMPROVEMENTS IN THE MANUFACTURE OF ORNAMENTAL PAPER AND PAPER BANDS.—This invention relates, first, to the manufacture of paper, showing the pattern of a reticulated or woven fabric upon it. This ornamental appearance is obtained either by the introduction of lace, or other open woven fabric, into the body of the paper, during the process of manufacture, or by subjecting colored paper, either pulp-dyed or surface-colored, or enamelled, to great pressure between metallic-plates or rollers, while a piece of lace, or other fabric, of the pattern desired to be imparted to the paper, lies in contact therewith; whereby an indentation of the threads is produced on the surface of the paper.

The paper ornamented by the introduction of the open textile fabric during its manufacture, is also greatly strengthened thereby, and rendered particularly applicable to the manufacture of bands for wrapping up lace or other articles; its application to which manufacture forms the second part of the invention.

The web of bobbin-net or other open textile fabric, is introduced into the substance of paper, at the time of its manufacture from the pulp, in the following manner: A web of net, of any suitable width, and of any required or convenient length, having been obtained, it is wound upon a reel or cylinder, mounted near the paper-making machine, as hereafter described. The description of paper-making machine employed, is that known as the cylinder or air-paper machine, which was the subject of Letters Patent formerly granted to John Dickinson.

The second part of the invention relates to the production of various patterns, in imitation of lace and other textile fabrics, upon colored papers, whether pulp-dyed, surface-colored, or enamelled. For this purpose, the lace or other fabric, the pattern of which is required to be reproduced upon paper, is cut into pieces of a size rather larger than the sheets of colored paper to be operated upon, and stretched upon open frames, and satur ted with size or animal glue, which will enable them better to withstand the pressure to which they are to be subjected; when dry, they are cut to the size of the colored paper and applied to the surface of the same, and subjected to great pressure between flat or cylindrical metallic surfaces, as is commonly practiced in glazing or milling papers; and, in consequence, those parts of the paper which are in contact with the filaments of the lace or other ornamental textile fabric, are exposed to a greater pressure than those parts where no such filaments intervene between the pressing surfaces, and the coloring matter upon them becomes more condensed, and is consequently rendered darker; so that the pattern of the lace or other ornamental textile fabric is produced in a darker shade of the color with which the paper is

tinted; and if the paper be held up to the light, these darker portions, which constitute the pattern, will (owing to their being more condensed) appear less opaque than the ground color. In thus ornamenting enamelled or surface-colored papers, it is preferred to apply the lace or ornamental textile fabric to the side of the paper which has not been colored.

IMPROVEMENTS IN METALLIC PISTONS.—These improvements consist in a method by which the piston-rings of metallic pistons can be tightened up whenever required, without the labor of taking off the cylinder cover and junk-ring of the piston; at the same time insuring equal pressure upon each spring or other power required to force out the piston-rings during the process of tightening; to this end a plug is fitted into a round hole in the center of the piston, and grooved with the same number of grooves as there are springs in the piston. These grooves are not cut parallel with the outside of the plug, but deep at one end and run out to nothing at the other—forming an inclined plane or wedge; the bolts, which are connected to the springs, rest in these grooves. When the piston is first inserted, they are placed in the deepest part of the groove or bottom of the incline. Through the plug a screw is inserted, having a conical collar, which is fitted and ground into the inside of the junk-ring of the piston; a square head to the screw going through and extending about one-and-a-half inches outside of the junk-ring. In the center of the cylinder cover a hole is made for the insertion of a box spanner, which fits the head of the screw that extends out of the junk-ring. When the piston requires tightening up, the plug in the center of the piston is caused, by the spanner, to retire inwards, and the bolts attached to the springs are forced to a greater distance from the center of the piston, by the inclined grooves in the plug; thus tightening up the springs.

In vertical engines, or other machines where the piston is accessible only from the top, a center-screw and plug cannot be placed, but four or more screws, (according to the number of springs in the piston,) working in wedges, are inserted for tightening the rings, upon the same principle.

THE RAIL-BIRD.—ITS MIGRATIONS.

MUCH discussion has been elicited of late through the medium of the newspaper press in Virginia and elsewhere, in regard to the appearance and disappearance of the Sora, Ortlan, or Rail-bird, to and from the marshes and flats that line the rivers which empty their waters into the Atlantic. Those birds are quite numerous in the months of August and September. As far back as 1822, myself and several other youths conceived it rare sport to push one another about in small skiffs, waist-deep in water, among the reeds on the flats of the Delaware, at high water, to shoot rail, as we called them there. They were an easy prey, even to juvenile marksmen. On dark, cloudy days we found them much fleeter on the wing, requiring more skill in shooting them than on a clear day with bright sunshine.

As late as the year 1840 I found sufficient inducement for many days to follow rail shooting until the 5th of October, at which time they nearly disappeared from our flats, save a few that doubtless had been wounded by the legion of sportsmen constantly seeking their destruction.

A few days after the above period I started on a gunning and fishing excursion, near a hundred miles down the peninsula or eastern shore of Maryland, on the marshes and flats of the streams that empty their waters into the Chesapeake, south of the gunning locality of the Delaware. I was there somewhat surprised to find the rail quite plenty, but for a few days only. After remaining there for a week they were as scarce and hard to find as they were when I left the Delaware.

They take to flight in the night, as they cannot see by daylight. I have heard their cheerful voice in flocks over my head in the night, winging their way southward, no doubt alighting as they approach a suitable place, or as daylight appears, obstructing their vision. They keep down where it is somewhat dark, among the grass and reeds, hunting food, and their continuance in a place is governed by the quantity and quality of food, and the non-appearance of frost, which they appear to dislike and flee from.

Now there is no doubt that if I had continued my journey into the Carolinas, after their disappearance from the Chesapeake, I should have found them there,—migrating still further south as the frost approaches them, till they get beyond the reach of it, where they breed, and where their young are grown.

They commence their annual migrations northward in the night, passing from marsh to marsh along the rivers, and from river to river and bay to bay, reaching the middle States about the 1st of August.

THOMAS CHAMPION.

VOLCANIC ERUPTION

OF MAUNA LOA, IN THE SANDWICH ISLANDS.

[THE account of this eruption is too intensely interesting to be passed in silence. We extract liberal portions of a letter from Hilo, published in the *American Journal of the Arts and Sciences*, from an eye witness, Rev. Mr. Coan. He says:]

"For sixty-five days the great summit furnace on Mauna Loa has been in awful blast. Floods of burning desolation have swept wildly and widely over the top and down the sides of the mountain. The threatening stream has overcome every obstacle, winding its fiery way from its high source to the bases of 'the everlasting hills,' spreading in a molten sea over the plains —penetrating ancient forests—driving the bellowing herds, the wild goats and the affrighted birds before its lurid glare—consuming all vegetable life with its sulphurous breath, and leaving nothing but blackness and ruin in its track.

On the 12th of July I wrote you on the state of old Kilauea, and on the 27th of Sept., I announced to our mutual friend, Mr. Lyman, the fact and the state of our present eruption. Having made my quarterly pastoral tour, I started on the second instant for the scene and the source of the eruption which is the theme of this letter. Our party consisted of Lawrence M'Cully, Esq., a graduate of Yale and our present acting magistrate, four natives and myself. Taking the channel of the Wailuku (the stream which enters Hilo bay) as our track, we advanced with much toil through the thicket along its

banks, about twelve miles, the first day. Here we rested at the roots of a large tree during the night. The next day we proceeded about twelve miles farther, for the most part along the bed of the stream, the water being low. During both of these days volcanic smoke had filled the forest and given the rays of the sun a yellow and baleful hue.

At night, when the shades gathered over those deep solitudes, unbroken except by the bellowing of the untamed bull, the barking of the wild dog, the grunt of the forest boar, the wing and the note of the restless bird, the chirping of the insect, the falling of a time-worn tree, the gurgling of the rill and the wild roar of the cataract, we made our little bed of ferns under the trunk of a prostrate tree, and here, for the first time, we found that the molten stream had passed us by, many miles, on its way toward Hilo. But as its track was several miles to the left of us, and as the jungle here was nearly impenetrable, we proceeded the next day up the stream, and at half-past one P. M., found ourselves fairly out of the forest, having been a little more than two and a half days in accomplishing this part of the tour.

I cannot stop to describe the beautiful and romantic scenery along our winding valley gorge, the cascades, basins, caves, and natural bridges of this wild and solitary stream. Nor can I speak of the velvet mosses, luxuriant creepers hanging in festoons, the ancient forest trees and other tropical glories which were mirrored in its limpid waters. We needed an artist and a naturalist to fix the glowing panorama, and to describe its flora and fauna. Wild cattle, dogs and hogs of the mountains have penetrated these forests and have appeared, of late, on the very confines of improvement within five miles of our bay.

But to proceed. When we emerged from the upper skirts of the woods on the third day, a dense fog obstructed our view of all distant objects. We encamped early in a cave, but during the night the stars came out and we could see the play of the volcanic fires from the summit to the base of the mountain and far down in the forest toward Hilo. The next morning, Friday, we left our cavern early, and at half-past seven, A.M. came to the smouldering lava-stream. From this time to ten A.M., we walked on the right border of the stream, when we crossed over to the opposite side. This occupied us an hour and a quarter, and we judged the stream to be three miles wide at this point, which, however, was one of its "*narrows.*" In some places it spread out into wide lakes and seas, apparently from five to eight miles broad, inclosing, as is usually the case, little islands not flooded by the fusion. Passing up the southern verge of the stream we found many trees felled by the igneous current, and lying crisped and half charred upon the stiffened and smoking lava. All this day we passed up the stream, sometimes on it and sometimes along its margin, as the one or the other track was the easier or the more direct. At night we slept upon the lava, above the line of vegetation, with the heavens for our canopy and the stars for our lamps. From this high watch-tower we could see the brilliant fire-works far above and far below us, as the dazzling fusion rushed down its burning duct, revealed here and there by an opening through its rocky roof, serving as a vent for the gases.

Early on Saturday, the 6th, we were ascending our rugged pathway amidst steam and smoke and heat which almost blinded and scathed us. At ten, we came to open orifices down which we looked into the fiery river which rushed furiously beneath our feet. Up to this we had come to no open lake or stream of active fusion. We had seen, in the night, many lights like street lamps glowing along the slope of the mountain at consid-

erable distances from each other, while the stream made its way in a subterranean channel, traced only by these vents. From 10 A.M. and onward, these fiery vents were frequent, some of them measuring ten, twenty, fifty or one hundred feet in diameter. In one place only we saw the river uncovered for thirty rods and rushing down a declivity of from 10° to 25°. The scene was awful, the momentum incredible, the fusion perfect, (a white heat), and the velocity forty miles an hour. The banks on each side of this stream were red-hot, jagged and overhanging, adorned with burning stalactites and festooned with immense quantities of filamentose, or capiltary glass, called "Pele's hair." From this point to the summit crater all was inexpressibly interesting.

Valve after valve opened as we went up, out of which issued "fire and smoke and brimstone," and down which we looked as into the caverns of Pluto. The gases were so pungent that we had to use the greatest caution, approaching a stream or an orifice on the windward side and watching every change or gyration of the breeze. Sometimes whirlwinds would sweep along, loaded with deadly gases, and threatening the unwary traveler. After a hot and weary struggle over smoking masses of jagged scoria and slag, thrown in wild confusion into hills, cones and ridges, and spread out over vast fields, we came at 1 P.M. to the terminal or summit crater.

This we found to be a low, elongated cone, or rather a series of cones, standing over a great fissure in the mountain. Mounting to the crest of the highest cone, we expected to look down into a great sea of raging lavas, but instead of this the throat of the crater at the depth one hundred feet was clogged with scoria, cinders and ashes, through which the smoke and gases rushed up furiously from seams and holes. One orifice within this cone was about twenty feet in diameter, and was constantly sending up a dense column of blue and white smoke which rolled off in masses and spread over all that part of the mountain, darkening the sun and obscuring every object a few rods distant. So toppling was the crest of this cone, so great the heat, and so deadly the gases, that we could find no position where we could look down the throat or orifice; and could we have done so, it is not probable that we should have seen the deep fountain below us, as the lavas were forced up its horrid chimney from the burning bowels of the earth. I have no doubt that the point at which the igneous river flowed off in its lateral duct was at least five hundred, perhaps a thousand feet below us.

The summit cone which we ascended was about one hundred feet high, say five hundred feet long and three hundred broad at base.

Several other cones below us were of the same form and general character, presenting the appearance of smoking tumuli along the upper slope of the mountain. As you descend the mountain these cones become lower and less frequent, but here they are the rims or jagged jaws of those orifices through which we look into that subterranean tube of angry fusion which hurries with such fearful speed down the side of the mountain.

The molten stream first appears some ten miles below the fountain crater, and as we viewed it rushing out from beneath the black rocks, and, in the twinkling of an eye, diving again into its fiery den, it produced indescribable feelings of awe and dread.

This summit crater I estimate at twelve thousand feet elevation; the principal stream (there are many lesser and lateral ones) including all its windings, sixty miles long; average breadth, three miles; depth, from three to three hundred feet, according to the surface over which it flowed.

Late on Saturday afternoon we came a short distance down the mountain, when we encamped on the naked rocks until Monday.

Unwittingly we passed the last watering place in our ascent on Friday morning, at seven o'clock, and having only one quart in our canteen, this was our whole supply until 9 A.M. on Monday. There being six of us, we were soon reduced to a single spoonfull each, and this only at our meals. Our food being dry and hard, we suffered not a little for want of nature's beverage. The dew which fell upon our garments, our food-buckets and the rocks around us congealed and became frost or thin scales of ice, and from our oil-cloth, spread for the purpose, we collected a few spoonfull of the latter, while our parched lips readily kissed the rocks to obtain a little moisture from the frost. There was snow on another part of the mountain, far below us, but it was not in our track. The fires had melted all in this region.

The present eruption is between those of 1843 and 1852, and from our high tower we could see them both and trace their windings.

Early on Monday we decamped and set our faces for Kilauea, distant some thirty-five miles, hoping by a forced march to reach it at night.

At eight A.M., we passed the seat of the grand eruption of 1852, and traveled for miles in its cinders. A little steam only issues from that cone whose awful throat, in 1852, sent up a column of glowing fusion to the height of a thousand feet.

At the base of this cone, on the opposite side, the ground was thickly powdered with a hoar frost, and so intense was our thirst that our whole party lay down together and eagerly licked it from the rocks and sand.

At nine we found water, for which we gave heartfelt thanks to our great Shepherd. At one P.M., a dense fog obscured our track, our guide lost his way, and we were obliged to encamp.

Early on Tuesday morning we were astir, wandering through jungle and over rough fields of scorie, when fortunately at half-past nine we found the only track which could lead us out of this cruel labyrinth.

At half-past one P.M., we reached old Kilauea, where we regaled ourselves on Ohelo berries, water, and such stores as were left in our larder.

The next day we explored Kilauea, made some measurements, collected specimens, etc., and on Thursday, the 11th inst., we reached Hilo, having been absent ten days. Kilauea is still very active, though not as intensely so as in months past.

On the mountain and in Kilauea I took the angles of several lava streams, one of 49°, another of 60°, and two of 80° each. Several streams on the mountain flowed down banks of scoria twenty-five and thirty feet high.

The fusion was complete—the streams cooled in a perfect state.

I also saw thin strata, say one inch thick or less, which had flowed down the face of perpendicular rocks, adhering to the rocks like paste, and thus cooling. Will you say that I spoil my demonstration by *proving too much*, when I assert that I saw more than on place where the fusion flowed on an angle of 95°—like the Indian's tree which grew so bolt upright that it "leaned the other way,"—thus flowing down a rock or bank until it came to where said rock *retreated*, it would follow the inward curve in a thin layer like molasses, adhering to the rock and thus cooling. It is therefore a fact capable of entire demonstration that our Hawaiian lavas flow freely down every slope, from an angle of 30′ to a perpendicular—in the latter case in a very thin layer of course. At one point we saw the great igneous river flowing like oil down an angle of 35°, and in another place it leaped a precipice, forming a brilliant cascade.

But I lack time and space to tell you half which we saw, and heard, and felt.

Hilo is now in a state of solemn and thoughtful suspense. The great summit fountain is still playing with fearful energy, and the devouring stream rushes madly down towards us. It is now about ten miles distant—nearly through the woods, following the right bank of the Wailuku, and heading directly for our bay.

Some are planning, some packing, many running to and fro, and all talking and conjecturing. Never was Hilo in such a state before. And all is hushed and solemn.

Oct. 22.—I have retained this letter until the present time, to watch the progress of the lava stream and to report more definitely; and I am happy I happy to say that as yet our fears have not been realized. The great summit crater still pours out its burning floods with unabated energy, and the atmosphere of the island is still loaded with smoke; everything looks dingy, often baleful. The stream of fusion still glows and groans in the forest between us and Mauna Loa; but its intensity seems a little abated and its progress retarded. Probably it is partially obstructed or diverted in its subterranean passage, while the basins, ravines, gorges, etc., it fills in the woods, together with the great forest which it must consume, render its progress very slow. Consequently the apprehensions of our people are much abated. There has been nothing like panic from the beginning, either among foreigners or natives; but there was an anxious look, an inquiring tone, a serious concern among all classes. These have greatly subsided; not that the fire is extinct, or that it is not nearer than it was two weeks ago; but simply that its progress for the last week has been almost imperceptible. Still it may come when least expected. Should it succeed in pushing through the woods it will then flow down on an angle of from 1° to 2° with little to obstruct it; or, should it dive into subterranean chambers, it may burst out unexpectedly near our shores.

It is now seventy-two days since the eruption commenced, and, as remarked before, the fountain is in full force. The matter disgorged is of the same general character as in former eruptions. We saw nothing new. Among the salts, sulphur and sulphate of lime, are the most abundant. They are scattered freely at several points along the line of flow.

There are now about a dozen open lakes of raging lavas in Kilauea, extending in two semi-circular-lines from the great fountain lake—*Halemaumau*—along the eastern and western sides of the crater, and evidently forming vents tc igneous subterranean canals which are carrying the incandescent floods from this great active vent to the northern parts of the crater, sometimes overflowing this region and sometimes heaving up the ponderous superincumbent strata, like the surface of an agitated ocean. The great dome over Halemaumau is swept away, and a raised and jagged rim from 20 to 60 feet high, now encircles it. The fusion may be 100 feet below. The movement of the streams northward is distinctly seen through the valves or vents mentioned above. The great central plateau of 200 feet elevation as mentioned in my last letter, is now nearly covered with fresh lava from the overflowing of its fiery zone—or of that half which surrounds it, and to which the recent action has been confined. This belt or lava zone has been raised from 100 to 200 feet since April; 1st, by uplifting forces; 2d, by successive overflowings.

The commencement of this eruption is mentioned in an earlier letter from

Mr. Coan, addressed to Rev. C. S. Lyman, of this place. It is dated Hilo, Sept. 27, 1855. He says:

"On the evening of the 11th of August, a small point, glowing like Sirius, was seen at the height of 12,000 feet on the northwestern slope of Mauna Loa. This radiant point rapidly expanded, throwing off corruscations of light until it looked like a full orbed sun." The sequel is described in the letter above.

THE COLOSSAL WASHINGTON MONUMENT FOR AMERICA.—The London *Builder* gives the following account of an important step in the progress of this work:

The casting of the horse for this monument at Munich, is one of the great feats of modern foundry, as fifteen tons of bronze had to be melted and kept in a state of fluidity. For several days and nights previously a large fire was at these huge masses, which required to be stirred at times. When the bronze was liquified, an ultimate assay was made in a small trial cast; and to heighten the color some more copper was added. Successively all the chambers through which the metal had to flow in the form were cleared of the coal with which they had been kept warm, and the master examined all the air spiricles and the issues of the metal; the props of the tubes were then placed and every man had his duty and place assigned to him. Finally, the master, amid the intense expectation of the many art amateurs present, pronounced the words, "In the name of God," and then three mighty strokes opened the fiery gulf, out of which the glowing metal flowed in a circuit to the large form. The sight was magnificent, and in the little sea of fire stood the master, and gave his commands about the successive opening of the props. Hot vapor poured from the air spiracles; in the conduits, the metal boiled in waves; still no decision yet, as the influx of the bronze in the very veins of the figure could be but slow. At once flaming showers jumped out of the air conduits, and the master proclaimed the cast to have succeeded. A loud cheer followed, when the master approached Mr. Crawford, the artist of the Washington Monument, to congratulate him on this success. Another cheer was given to M. de Miller, the chief of the royal foundry of Munich, who has personally conducted the work.

MANUFACTURE OF WATCHES.—A watch is no longer, as it was formerly, an object of luxury, destined exclusively for the rich; it has become an article of the first necessity for every class in society, and as, together with the increased perfection of this article, its value has in the same time considerably diminished, it is evident that a common watch, which will exactly indicate the time of the day, is actually, by its low price, within the reach of almost every individual, who will likewise feel anxious to possess one.

For this reason, and in proportion as commercial and maritime relations are extended and emancipated from the trammels in which the great central marts of commerce have involved them, so will distant nations become civilized; and it may be fairly anticipated that the art of watch-making will form part of the great current of improvement.

The number of watches manufactured annually in Neufchatel may be calculated from 100,000 to 120,000, of which about 35,000 are in gold, and the rest in silver.

Now supposing the first on an average to be worth $30, and the others $4, it would represent a capital of $1,390,000, without taking into consideration the sale of clocks and instruments for watch-making, the amount of which is very large.

The United States of America consume the largest quantity of those watches. With the exception of gold and silver for the manufacture of the watch-cases, the other materials for the construction of the works of mechanism of the Neufchatel watches are of little value, consisting merely of a little brass or steel. The steel is imported from England, and is reckoned the best that can be procured; the brass is furnished by France.

With respect to gold and silver the inhabitants of Neufchatel have had for a long time no other resource but to melt current money, until they received gold from England, which the English merchants receive from California.

The number of workmen who are employed in watch making is estimated at from 18,000 to 20,000, but it is difficult to arrive at the exact number, as the population employed carry on the business in their own houses.

The spirit of adventure is very strong among the inhabitants of the Jura Mountains. A great many of them have traveled into very remote countries, whence some have returned with considerable fortunes.—*Merchant's Magazine.*

Ship Building in New-York.—The New-York *Courier & Enquirer* submits its annual statement of the business done in ship building at that port, which shows that the past has been a year of depression in the ship yards unexampled within a generation. Amongst the causes assigned for this are the European war, the falling off in the California and Australian trade, and the overbuilding in the last few years. Many master ship-builders had become bankrupt, owing not so much to the increased wages demanded by their workmen, as by the forfeitures to which they were subject in not getting their work completed in time, from the men not continuing steadily at their work. The following is a comparative return of the new ships launched in the present and past years:

	1854		1855	
	No.	Total Ton.	No.	Total Ton.
Steamships,	19	24,600	4	11,100
Other steam vessels,	23	5,967	4	2,200
Ships,	30	39,380	6	9,130
Barques,	7	3,600	7	3,376
Brigs,	8	2,551	3	1,275
Schooners, etc.,	21	5,292	13	3,786
Total,	108	81,390	37	29,867

There are also now on the stocks 17 vessels of all sorts, with an aggregate tonnage of 21,720 tons.

Experiments with Potatoes.—The question being often asked, which variety of potatoes is most profitable for field cultivation, on the 16th of last May I planted a field with eight kinds, in eight successive plats, the rows running through each successive plat—soil rather thin, manured alike lightly in the hill—crop moderate. On October 10th, dug twelve hills of each kind, counted and weighed. The following is the result:

Peachblow—180 tubers, weight 25 pounds—seed small, 2 tubers to each hill.

California—104 tubers, weight 24 pounds—seed large, cut in 6 to 8 pieces, 2 to each hill.

Torries—138 tubers, weight 23¾ pounds—seed large, cut in 8 pieces, 2 to each hill.

Black Mercers—220 tubers, weight 20 pounds—seed small, 2 to each hill.

English Whites—156 tubers, weight 18¼ pounds—seed small, 2 to each hill.

Merinos—100 tubers, weight 17 pounds—seeds large and cut.

Pinkeyes—116 tubers, weight 16½ pounds—seed small, 2 to each hill.

Lilacs—125 tubers, weight 16 pounds—seed small, 2 to each hill.

This is the result of one trial; other trials may produce different results, that is, lead to further experiments.—A. YEOMANS, *in Country Gentleman.*

IRON YARDS FOR SHIPS.—Some novelties are observable in the fitting out of the Australian Black Ball ship Schomberg. Her 'tween decks are fitted up with iron berths throughout, which have a pretty and light appearance. Her iron tanks are fit to carry either water or provisions, and while they are able to bear any weight placed upon them, they act as permanent ballasts for the ship. The foreyard of the vessel is a hollow iron tube, made of quarter inch plates. It is 96 feet in length, 23 inches at the slings! greatest circumference, 6¼ feet. It weighs 4 tons—a wooden spar same size would weigh 8½ tons—an important advantage in favor of the iron yard, especially when its durability is also taken into consideration. The first cost is a little more than wood.—*Liverpool Mail.*

PORTRAIT OF CHARLES I, BY VELASQUES.—We have seldom been more favorably disappointed than we were on visiting this picture. It is undoubtedly an original. No copyist could make such a representation on canvass. It bears all the tests of a close or distinct view, of inversion and of the magnifier. The last, the magnifier, brings out its excellencies in a most wonderful manner. The eyes are eyes, the hair is hair, and the flesh is flesh. We have seen many of the works of the old masters, but we have never seen a portrait which bore more unequivocal and unquestionable evidence of the hand of a great master than does this. The proprietor is a gentleman not only of courteous manners but thoroughly versed in the history and condition of this department of art.

PRODUCTS OF THE INDUSTRY OF BOSTON.—The returns to the Secretary of State of the products of the Industry of Boston, for the year ending June 1, 1855, as compiled for the Boston Almanac, shows that iron, exclusive of that for nails, was manufactured to the value of $1,525,000; steam engines and boilers, $1,835,000; iron railing, iron fences, safes, etc., $562,500; glass-ware, $1,190,000; piano-fortes and other musical instruments, $1,984,700; watches, gold and silver ware, and jewelry, $617,000; saddles, trunks, harnesses, etc., $757,200; brushes, $225,000; upholstery, $1,550,800; sails, of American fabric, $431,172; sugar refined, $2,000,000; chair and cabinet ware, $1,068,800; tin-ware, $416,500; linseed oil $500,000; camphene and burning fluid, $500,000; flour, $870,000; boots and shoes, $193,000; building stone, $323,000; marble prepared, $311,000; horses, (4,800), $761,625; cows, (132), $5,405; casks, $158,600; distilled liquors, $2,495,000; beer, $238,000; friction matches, $50,000; bakeries, $935,000; clothing, *eight million five hundred thousand dollars!*

DENTISTRY.—We have had occasion to notice several specimens of workmanship of this description, by Dr. A C. Castle, of 296 Fourth street, opposite Washington Square. He has great experience and practical skill, and there is no dentist for whose fidelity we should be more ready to indorse than his. Services of this kind are so difficult, and often expensive, and for a life-time, that it is of the greatest importance that they should be done well.

NEW BOOKS.

OUR COUSIN VERONICA, OR SCENES AND ADVENTURES OVER THE BLUE RIDGE. By MARY ELIZABETH WORMLEY. New-York: Bunce & Brother. 12mo. $1 25.

The author of "Amabel" has already the very highest of recommendations. This book is a fit companion for its predecessor. It is less highly wrought, but by no means dull or tame. The scene is principally in Virginia, partly in England. The descriptions are graphic and natural, and the story is capital. Miss Wormley must be set down, unquestionably, among the most gifted writers of fiction.

A YEAR BOOK OF AGRICULTURE; or, the Annual Agricultural Progress and Discovery for 1855 and 1856. By DAVID H. WELLS. 1856. Philadelphia: Childs & Peterson. 400 pages, 8vo.

This book is just what we anticipated on its announcement—a concise, clear statement and pescription of the various improvements in agriculture and its kindred sciences during the year, fully and well illustrated. It should be on every farmer's table, and carefully studied, for it is a work of great practical value.

WOODWORTH'S YOUTH'S CABINET AND UNCLE FRANK'S DOLLAR MAGAZINE. Edited by FRANCIS C. WOODWORTH, assisted by "Francis Forrester" and "Aunt Sue."

The external appearance of this popular magazine is much in its favor. It is well printed on good paper, well stitched, etc. This encourages us to look inside, for we do like to see books well printed, especially those for children and youth. It aids in forming a good taste and neat habits. Mr. Woodworth is just the man to publish a journal of this sort. He has just the right bumps for it; and as he gives much time and careful attention to it, always interests his readers. He is well sustained also by assistants, and those who wish for a youth's magazine cannot do better than to order this forthwith.

$1 a year; 4 copies, $3 50; 5 copies, $4; 8 copies, $6. 118 Nassau st.

SENSE AND SENSIBILITY. A Novel. By Miss AUSTEN, author of Pride and Prejudice, etc. New-York: Bunce & Brother. 1856. 309 pages.

A novel of no little interest, of the fashion published in our youthful days, by a pleasant writer.

CAMP FIRES OF THE RED MEN; OR, A HUNDRED YEARS AGO. By R. ORTON. Illustrated by Walcutt. New-York: J. C. Derby. 1855.

In this volume Mr. Orton takes some of the exciting scenes of Indian life in the last century to form the web of a curious romance. Those who are fond of this style of excitement will be entertained by it. It is well written and well executed.

LANMERE. By Mrs. JULIA C. DORR, author of "Farmingdale." New-York: Mason Brothers. 1856. 447 pages.

Those familiar with "Farmingdale" are not disappointed in this work. They ex-

pected a good book, and they have one of the very best stories we have ever seen. Little Bessie is brim full of interest, nothing exaggerated or disproportioned, but natural to the life. Mrs. Allison vexes us, while she is perfectly consistent throughout, and unhappily represents too many of great pretension. Debby is worth her weight in gold, while several other characters are drawn with great ability. The plot is intricate and ingenious, yet almost developes itself, and the work cannot fail to be read very extensively.

JACKSON AND NEW-ORLEANS; an Authentic Narrative of Memorable Achievements of the American Army under Gen. Jackson before New-Orleans in the winter of 1814 and 15. By ALEXANDER WALKER. New-York; J. C. Derby. 1856. 411 pages.

The campaigns of Gen. Jackson are brilliant specimens of generalship; and the Battle of New-Orleans is prominent over all others. This effort to extend the knowledge of this chapter of our history cannot fail to interest a multitude of readers, and will assist in disseminating a true understanding of the events of this period through the community. The volume is well executed.

NEW MUSIC.

WM. HALL & SON have the following choice pieces among their extensive recent publications, viz.:

"The Dreams of Youth." Ballad by W. J. Robson. Composed by J. W. Cherry. Simple and very pretty.

"Florence Vane"—ballad. Composed by W. Vincent Wallace. Good of course, and not difficult.

Quadrilles for the piano-forte. Composed by Alphonse Leduc. These include "Fall of Sevastopol," "Battle of Inkerman," "Expedition to the Sea of Azoff," "Battle of Schernaya," and "Capture of the Malakoff." Good, and characteristic, but requiring a strong hand to do them justice.

List of Patents Issued

FROM TERMINATION OF PREVIOUS LIST TO JAN. 8.

Erastus Bigelow, Boston, improvement in looms for weaving pile fabrics.

Jonathan L. Booth, Cuyahoga Falls, O., improvement in grain-cleaning machines.

T. C. Bush, New-London, Conn., improved saw set.

Wm. E. Cooper, Dunkirk, improved nozzle for exhaust pipes of locomotives.

Frederic W. Capen, Newton, Mass., for improvement in paddle wheels.

Joseph C. Day, Hackettstown, N. J., improvement in fire-arms.

Spencer B. Driggs, Detroit, improvement in piano-fortes; dated December 11, 1855; patented in England, November 1, 1855.

John Gourlay, Ogdensburg, for adjustable crank-brace for augers.

Henry C. Green, Clarence, Wisconsin, improved automatic feed motion for saw-mills.

A. M George, New-York, for improvement in spike machines.

H. B. Horton, Akron, O., machine for registering music.

Wm. W. Johnson, Clifford, Pa., machine for planing felloes.

Eber Jones, Troy, improvement in mould for casting bells.

S. B. McCorkle, Greenville, Tenn., for improvement in machines for stuffing horse collars.

Thomas Danforth, Roxbury, for improvement in window shades.

Isaac Davis, Mechanicsburg, Ohio, for improvement in machinery for whipping hair.

Soranus Dunham, North Bridgewater, Mass., for improved method of hanging saws.

Henry F. and Louis A. Gossin, Thibodeaux, La., for improvement in steam boiler furnaces.

John Griffen, Safe Harbor, Pa., for improved manufacture of wrought iron cannon.

Bishop J. Harris, Auburn, Pa., for improved mode of dressing mill-stones for scouring and hulling buckwheat.

Reuben Hurd, Spring Hill, Ill., for improvement in seeding machines.

Jno. P. Hale, Kanawha Court House, Va., for improvement in apparatus for making salt.

Benj. Hill, Rochester, for improvement in paddle-wheels.

Westel W. Hurlbut, Boonville, for improved method of hanging circular saws.

Alexander Lightheiser, Reading, for improvement in machines for mincing meat.

Wm. H. Merrill, of Taunton, for improvement in hoisting blocks.

Charles Miller, Carroll Township, Pa., for improvement in hulling machines.

Henry M. Parkhurst, Perth Amboy, for improvement in proportional dividers.

Adolphe Pecoul, Marseilles, France, for combined log and sounding line.

Newell A. Prince, Brooklyn, for improvement in fountain pens.

Ezra Ripley, Troy, for improvement in mills for grinding grain, &c.

James Robb, Lewiston, Pa., for improvement in corn-shellers.

John P. Rollins, Boston, for improved extension bit.

E. K. Root, Hartford, Conn., for improvement in revolving fire-arms.

Geo. W. Smith, Mauch Chunk, for improvement in looms for weaving wire.

Gilbert Smith, Buttermilk Falls, for improvement in breach-loading fire-arms.

Thos. B. Stout, Keyport, N. J., for improvement in corn and cob mills.

Ancil Stickney, Concord, N. H., for improvement in hand seed planters.

Isaac D. Wheelock, Maysville, Wis., for improvement in sad iron heaters.

Wm. Wilber, New-Orleans, for improvement in hydraulic oil presses.

Charles H. Butterfield, Nashua, assignor to Amory Houghton, Boston, for improvement in guards for lanterns.

Charles Evans, Charleston, Mass., assignor to himself and George K. Goodwin, Roxbury, Mass., for improvement in revolving grates.

Issued from the United States Patent Office, for the week ending Jan. 1, 1856 each bearing that date.

Philo Brown, Waterbury, Coon., for improvement in furnace for soldering.

Nathan Chapman, Mystic River, Conn., for improved chain for power press.

James Cochrane, New-York, for improved method of operating and lubricating slide valves.

Richard M. Cole, Reading, Pa., for improvement in brick presses.

Geo. W. Cooper, Ogeechee, Ga., for improvement in ploughs.

Jean Pierre Molliere, Lyons, France, for improvement in machines for polishing and burnishing the edges of soles and heels of boots and shoes; dated Dec. 11, 1855; patented in France, Jan. 5, 1855.

Jean Pierre Molliere, Lyons, France, for improvement in machines for mounting the "uppers" of boots and shoes on lasts; dated Dec. 18, 1855; patented in France, August 19, 1854.

Oldin Nichols, Lowell, and Amni M. George, Nashua, for improvement in stone-dressing machines.

Daniel Parish, New-York, for improvement in instruments for modifying focal length of the eye.

Isaac N. Parker, Lewiston, Me., for improvement in mill spindle steps.

Samuel Pelton, New-Windsor, Md., for improvement in horse powers.

George B. Pullinger, Philadelphia, for improvement in automatic gate for railroad crossings.

John P. Robinson, Mattawan, for plane for finishing grooves in patterns, &c.

Joel Tiffany and Milo Harris, Painesville, Ohio, for shingle machine.

Thomas F. Thornton, Buffalo, for improvement in organ melodeons.

Hubert Schonacker, Detroit, for improved pianofortes.

Julius E. Schwabe, New-York, for improvement in treating Galena or lead ore.

Eliphalet S. Scripture, Green Point, N. Y., for improvement in attaching hubs to axles.

Isaac Searles, Newark, for improvement in felting hat bodies.

Isaac Spaulding, Saratoga Springs, for improved saw set.

Samuel Shattuc, Henrietta, O., improved horse collar.

Isaac N. Singer, N. Y., improvement in sewing machines.

Jos. Weis, Bordentown, for improvement in suckers for pumps.

Thomas Bowles, New-York, assignor to Robert M. Patrick, of same place, for improvement in locks.

Jeremiah Burnite, Puseyville, Pa., assignor to himself and James Clark, of same place, for improved arrangements and combinations of machinery for regulating velocity of wind wheels.

John Healy, Bolton-le-Moors, England, assignor to James Bishop, New-Brunswick, N. J., for improvement in woven fabrics; dated Dec. 18, 1855; patented in England, Nov. 17, 1846.

Joseph B. Lancaster, administrator of John R. Lancaster, deceased, of Tampa, Florida, for improvement in cooking stoves.

Elijah Richmond, Abington, Mass., assignor to Ira Noyes, of same place, for improvement in lamp extinguishers.

Lewis C. Ashley, Troy, for improvement in candy mould apparatus.

Joseph Buhler, M.D., of New-York, for improvement in the pipes of a vapor bath.

Joseph Buhler, M.D., New-York, for improvement in the combination of injecting syringes,

Benijah J. Burnett, New-York, improvement in cranes.

George Byington, Rochester, for improvement in time indicators.

Robert L. Currey, Philadelphia, improvement in double-acting steam brake.

Thomas Crane, Fort Atkinson, for improvement in rotary pumps.

Lebbeus Barnes, Islip Township, N. Y., for improvement in harvesters.

Chas. E. Brown, New-York, N. Y., for improved mode of hanging double doors.

Samuel W. Brown, Lowell, Mass., for improvement in constructing the bottoms of ships and other vessels.

Reuben Brady, New-York, N. Y., for improved machine for sheet metal bending.

Irah Chase, Jr., Boston, Mass., for improvement in coal scuttle covers.

Geo. St. Clarke, East Washington, N. H., for improvement in bee-hives.

Edgar Conkling, Cincinnati, O., for improvement in the form of building bricks.

Dominique Emile Coutaret, Boston, Mass., for improvement in disinfecting fecal matter.

Thos. Davidson, Jr., Kensington, Pa., for improvement in street paving machines.

Jacob Erdle, West Broomfield, N. Y., for improvement in filing saws.

Morris Falkeman, New-York, N. Y., Morris Pollak and Solomon Weiner, Hoboken, N. J., for improved watch key.

L. H. Gibbs, Troy, New-York, for improvement in breech-loading fire-arms.

Chas. Hammond, Philadelphia, Pa., for improvement in attaching hammer heads to shafts.

James Harrison, Jr., Milwaukie, Wis., for improvement in padlocks.

Samuel R. Jones, Baltimore, Md., for improvement in peg-cutters for boots and shoes.

Geo. L. Jenks, Providence, R. I., for improvement in machinery for making weavers' harness.

Jos. Johnson, New-Orleans, La., for improvement in manufacture of hats.

John F. Manahan, Lowell, Mass., for improved mode of burning wet fuel.

Hiram B. Musgrave, Cincinnati, Ohio, for improvement in gas cooking stoves.

Wm. C. Pancost, Geneva Township, Ohio, for improvement in cheese presses.

Chas. Phillips, Detroit, Mich., for improved machine for loading dirt cars.

Randal Pratt, Marple Township, Pa., for improvement in horse hay-rakes.

J. J. Savage, New-York, N. Y., for improvement in excavating machines.

Christopher D. Scropyan, New-Haven, Conn., for method of preventing bank notes, &c., from being counterfeited.

Gustavus Stone, Beloit, Wis., for improvement in blades of mowing machines.

Wm. Stoddard, Lowell, Mass., for mortising machine.

Abraham Straub, Milton, Pa., for improvement in machines for sawing marble obelisks.

John G. Snyder, Wheatfield, Pa., for improvement in seeding machines.

Abner Whitely, Springfield, Ohio, for improvement in candlesticks.

Wm. E. Wyche, Brookville, N. C., for improvement in cultivating ploughs.

Geo. W. N. Yost, Port Gibson, Miss., for improvement in corn harvesters.

James H. Merrill, Baltimore, Md., for improvement in fire-arms.

Henry Pease, Brockport, N. Y., assignor to himself and James Roby, of same place, for improvement in mowing machines.

John Reily, Hart Prairie, Wis., assignor to Talbot C. Doneman, Ottowa, Wis., John Heath, Sullivan, Wis., and John Reily, aforesaid, for improvement in harvesters.

John J. Crocker, Utica, for improvement in safety guard for railroad cars.

Benjamin Fenn, of Hartford, Ohio, for windmill.

Geo. P. Gordon, New-York, for improved printing press.

Benj. Groomes, Cumberland township, Pa., for improvement in repeating fire-arms.

Elijah Holmes, Lynn, Mass., for spoke shave.

Walter Hunt, New-York, for improvement in shirt collars.

Waterman B. Johnson, Sandwich, N. H., for improvement in machines for pegging boots and shoes.

Moses W. S. Kendall, Cincinnati, for improvement in smoke houses.

Phineas L. Slayton, Madison, Ind., for improvement in sewing machines.

Daniel Leibee, Middletown, Ohio, for improved gold amalgamator.

Charles N. Lewis, Seneca Falls, for improved pumps.

Orson E. Mallory, Castile, N. Y., for improved machine for making eave troughs.

John H. Manny, Brockford, Illinois, for improvement in harvesters.

Thomas R. Markillie, Winchester, Ill., for improved bed for lath sawing machines.

Joseph Marsh, Rochester, for improved sash lock.

James Neal and Charles W. Emery, Boston, for pumps.

I. J. Oldis, Wheeler, N. Y., for improved padlock.

Jos. Peevy, Passadumbeag, Me., for improvement in hay and cotton presses.

Charles Robinson and Charles T. Chester, New-York, for improvement in automatic electrical circuit breakers.

Thomas Stubblefield, Columbus, Ga., for improvement in steam boiler alarms.

John C. Smith, Camden, N. J., for improvement in repeating magazine fire-arms.

Ira F. Thompson, New-York, for improvement in velocimeters for vessels.

Geo. W. N. Yost, of Port Gibson, for improvement in grain binders for harvesters.

Andrew H. Ward, Jr., Boston, for improvement in compositions for treating wool.

Hiram C. Wight, Worcester, for improved arrangement of feed rollers for planing machines.

Geo. Williamson, Brooklyn, for hydro-pneumatic pump for diving bells.

Joshua Turner, Jr., Charlestown, Mass., assignor to Warren Covell, Dedham, Mass., for improvement in the manufacture of leather shoe bindings.

Cullen Whipple, Providence, assignor to the New-England screw company, of same place, for improvement in screw machines.

Philo Marsh, South Adams, Mass., assignor to himself, and Shubael W. Howland, South Acton, Mass., for improvement in treating oils.

George A. Clarke, Philadelphia, assignor to Wm. Clarke of same place, for improvement in harvester raking apparatus.

RE-ISSUES.

Samuel Hurlbert, Ogdensburg, N. Y., for improvement in plows. Patented Sept. 20, 1853. Patented in Canada, Sept. 20, 1852.

Benj. F. Avery, Louisville, Ky., for improvement in plows.

N. Aubin, Albany, N. Y., for improvement in making illuminating gas.

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